MUTAH UNIVERSITY
Faculty of Engineering
Department of Computer Engineering

Course Syllabus
Study Plan 2021: Communication Track, and Power and Control Track

Course Code	Course Name	Credits	Contact Hours
0405487	Digital Design and Microprocessor Lab	**1**	**2T**

INSTRUCTOR/COORDINATOR	
Name	Dr Khaled Suleiman Al-Maaitah
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Office Hours	
Classroom/Time	

TEXTBOOK	
Title	Digital Design with an Introduction to the Verilog HDL
Author/Year/Edition	M. Morris Mano, Michael D. Ciletti./5th Edition

Other Supplemental Materials	
Title	Lab Sheet
Author/Year/Edition	

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

This lab is designed to teach students about the function of the individual logic gates such as AND, OR, and NOT gate, and how they can be connected in different structures to build basic computing components like adders. Several types of circuits are described in this lab including arithmetic circuits (adders and subtracter), data handling circuits (decoder and encoder) and sequential logic circuits such as counters. The internal structure of each circuit is described in detail, which shows the used logic gates and the nodes (pins) connection and their functionality (input-output) characteristics. Additionally, circuit simplification techniques are also introduced. For the practical side, in this lab, the student builds the circuit for each experiment using a Breadboard that is mounted on a specific test kit to check the correctness of the circuit's input-output relation.

B. Pre-requisites (P) or Co-requisites (C)

Microprocessors (0405486) **(P)**

C. Course Type (Required or Elective)
Required

SPECIFIC GOALS
A. Course Learning Outcomes (CLOs)
By the end of this course, the student should be able to: **CLO1**: Know the function of basic logic gates [6]. **CLO2**: Know how to connect number of basic logic gates and build more complex arithmetic or sequential logic circuits [6]. **CLO3**: Use the simplification techniques to build smaller and more efficient logic circuits [6]. **CLO4**: Know the differences between several computing components such as adders, subtracter, encoders, decoders, and types of counters [6]. **CLO5**: Work effectively in groups by sharing responsibilities and collaborating on findings [5].
B. Student Outcomes Addressed by the Course

1	2	3	4	5	6	7				
				✓	✓					

BRIEF LIST OF TOPICS TO BE COVERED		
List of Topics	**No. of Weeks**	**Contact Hours**
Individual logic gates (AND, OR, NOT, NAND, NOR, XOR)	3	6
De Morgan's theorem	1	2
Data handling circuits (Decoders and Encoders)	2	4
Arithmetic elements (Adders, Subtracter)	2	4
Binary memory elements (JK Flip-Flop)	3	6
Sequential logic (Asynchronous counter, Count-up ripple counter, Count-down ripple counter, Count-up Count-down ripple counter, Decade ripple counter)	3	6
Total	*14*	*28*

EVALUATION		
Assessment Tool	**Due Date**	**Weight (%)**
Mid Exam	According to the university calendar	20
Course Work (Homeworks, Quizzes, Projects, …etc.)	One week after being assigned	40
Final Exam	According to the university calendar	40

ABET's Students Learning Outcomes (Criterion # 3)		
	Relationship to program outcomes	
ABET 1-7		**Engineering Student Outcomes**
1		an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2		an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3		an ability to communicate effectively with a range of audiences.
4		an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5	√	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6	√	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7		an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.