

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Advance Logic Design (ALD)		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MIE40005			
Credits	4			
SWL (hr/sem)	100			
Module Level	UG IV	Semester of Delivery		7
Administering Department	MIE	College	MUC	
Module Leader	Ali Majeed		e-mail	ali.majeed.extmie@muc.edu.iq
Module Leader's Acad. Title	Assist.Prof.Dr.	Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	8/11/2023	Version Number	1.0	

1. Modes of Attendance offered	Weekly (practical + theoretical)
2. Semester/Year	2025-2026
3. Number of hours tuition (total)	Theory (60 h) and practical (60 h)
4. Date of production/revision of this specification	16/08/2022
5. Aims of the Course	
6- Teaching the student to program the Arduino microcontrollers in C language	
7- Teaching the student on how to use the Arduino microcontroller in different scientific applications	
8-Design and implementation of different scientific projects based on Arduino microcontrollers	
9- Teaching the student to identify advanced digital electronic circuits and how to distinguish between them.	
A- Teaching the student to design digital electronic circuits	

B- Identify the types of digital memories and programmable electronic circuits

10· Learning Outcomes, Teaching ,Learning and Assessment Method

R- Knowledge and Understanding

A1. The student lists the types of digital integrated circuits

A2. The student recognizes the difference between digital integrated circuits A3. The student recognizes to digital memory types and programmable digital circuits

A4. The students learn how to programming the microcontroller in C language A5. The student programs the microcontroller

A6 .The student learns several applications of the microcontroller

B. Subject-specific skills

B1. The student uses digital electronic circuits

B2.The student uses programs to program the microcontroller

B3. Students acquire programming skills in C language

B4. The student writes the results obtained by the experiments

Teaching and Learning Methods

Theoretical and online lectures, role playing, brainstorming, and experiments

Assessment methods

- Written quarterly examinations
- Practical Quarterly Examinations
- Weekly Tests (Oral / Written)
- Quizzes
- pre- test and post-test

C. Thinking Skills

C1. The student listens to the explanation

C2. The students learn about the impact of science and scientists in life C3. The student should describe the importance of learning the subject of Advanced Logic Design (ALD)

C4. The student is concerned with quietly and the class system

Teaching and Learning Methods

Discussion and dialogue with students

Assessment methods

Questionnaire, Seminars, Discussion Hubs

D. General and Transferable Skills (other skills relevant to employability and personal development)
D1. Sports activities D2.
Technical activities D3.
Literary activities D4.
Voluntary activities

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	Theoretical (2) Practical (2)	The student understands the lesson	Introduction to Arduino	Theory and practical	Direct questions
2 and 3	Theoretical (2) Practical (2)	The student understands the lesson	Arduino Programming Language	Theory and practical	Quiz
4	Theoretical (2) Practical (2)	The student understands the lesson	Digital and Analog Inputs of Arduino	Theory and practical	Direct questions
5 and 6	Theoretical (2) Practical (2)	The student understands the lesson	Getting Input from Sensors to Arduino	Theory and practical	Quiz
7	Theoretical (2) Practical (2)	The student understands the lesson	Matrix keypad interface with Arduino	Theory and practical	Direct questions
8	Theoretical (2) Practical (2)	The student understands the lesson	Liquid crystal display (LCD) interface with Arduino	Theory and practical	Quiz
9	Theoretical (2) Practical (2)	The student understands the lesson	Arduino Hardware Interrupt	Theory and practical	Direct questions
10	Theoretical (2) Practical (2)	The student understands the lesson	Arduino Power Saving Sleep Modes	Theory and practical	Quiz
11 and 12	Theoretical (2) Practical (2)	The student understands the lesson	Wave generator based on Arduino	Theory and practical	Direct questions
13 and 14	Theoretical (2) Practical (2)	The student understands the lesson	Interface GLCD with Arduino	Theory and practical	Quiz
15	Theoretical (2) Practical (2)	The student understands the lesson	Arduino troubleshooting	Theory and practical	Direct questions
16	Theoretical (2) Practical (2)	The student understands the lesson	TTL and CMOS Family	Theory and practical	Direct questions
17	Theoretical (2) Practical (2)	The student understands the lesson	Astable multivibrators	Theory and practical	Direct questions

18 and 19	Theoretical (2) Practical (2)	The student understands the lesson	Decoders. (4-to-16 decoder, The BCD decoder , BCD to Seven-segment decoder).	Theory and practical	Quiz
20 and 21	Theoretical (2) Practical (2)	The student understands the lesson	Random Access Memories (RAMs)	Theory and practical	Quiz
22 and 23	Theoretical (2) Practical (2)	The student understands the lesson	Read only Memories (ROMs).	Theory and practical	Direct questions
24 and 25	Theoretical (2) Practical (2)	The student understands the lesson	Programmable Read Only Memories (PROMs) [EPROMs, UV EPROMs, and EEPROMs].	Theory and practical	Quiz
26 and 27	Theoretical (2) Practical (2)	The student understands the lesson	Programmable Logic Arrays (PLAs) [PAL, FPLA and FPGA].	Theory and practical	Direct questions
28	Theoretical (2) Practical (2)	The student understands the lesson	First in –First out serial memories (FIFOs).	Theory and practical	Quiz
29	Theoretical (2) Practical (2)	The student understands the lesson	Last in - First out memories (LIFOs).	Theory and practical	Direct questions
30	Theoretical (2) Practical (2)	The student understands the lesson	Universal Asynchronous Receiver Transmitter (UART)	Theory and practical	Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1- Digital fundamentals ninth edition by Thomas L.Floyd 2006 2- “Arduino Cookbook” Published by O’Reilly Media, by Michael Margolis Inc., First Edition. 2011 United States of America.
Special requirements (include for example workshops, periodicals, IT software, websites)	http://www.arduino.cc
Community-based facilities (include for example, guest Lectures , internship , field studies)	1- Digital Principles and Logic Design ,chapter 11. by A. Saha and N. Manna. 2007. 2- Digital Electronics Principles, Devices and Applications ,chapter5. by Anil K. Maini 2007. 3- Theory and Problems of digital principles third Edition ,

	chapter6. by ROGER L. TOKHEIM, M.S.1994
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13. Admissions	
Pre-requisites	
Minimum number of students	60 (admission plan)
Maximum number of students	75 (admission plan)