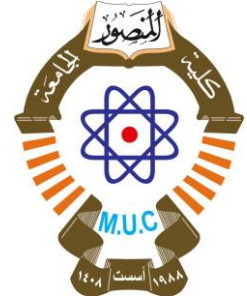




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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microcontroller		Module Delivery
Module Type	Core		
Module Code	COM 24109		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGII	Semester of Delivery	2
Administering Department	BSc - COMM	College	Al-Mansour University College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	2024/9/1	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	



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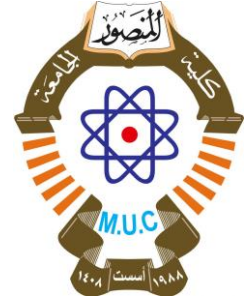
Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. The student learns about the basics of the Microprocessor and the Microcontroller and can be able to comparison between them. 2. The student learns about the basics of Embedded Systems (Hardware & Software). 3. The student learns about the basics of Digital Signal Processing Systems (Hardware & Software). 4. The student learns about the Arduino Types and Hardware Description. 5. The student learns about the Arduino software (IDE) and program structure. 6. Identify and be able to explain the data types and functions of the Arduino. 7. Identify and be able to explain the variables & Constants and how to treat them. 8. Being able to test the IDE program to run the pulse width modulation. 9. The student will be able to write Arduino codes to run some basic tasks. 10. The student will also be able to Programming Techniques: Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements, Loops, The Switch Structure, and Debugging Arduino Lab Programs. 11. The student will be able to use the Arduino board and connect other devices to implement some laboratory experiments
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Enabling students to know the concepts of Microprocessor and Microcontroller 2. Enabling students to know the types and applications of Microprocessor and Microcontroller 3. Enabling students to know how to treat with Arduino boards. 4. Enabling students to know how to connect Arduino boards with the sensors. 5. Enabling students to write Arduino codes in C++ language. 6. Enabling students to test and run the code and display results and errors.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <ul style="list-style-type: none"> ▪ Course Introduction (4 hrs) ▪ Working with Powerpoint (8 hrs) ▪ Theoretical lectures (32 hrs) ▪ Lap (16 hrs)
<p>Description</p>	<p>This course introduces students to the principles and techniques of the Microcontrollers. It covers the fundamental concepts of Arduino boards and</p>



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various sensors. The course also explores key topics such as Programming Techniques: Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements, Loops, The Switch Structure, and Debugging Arduino Lab Programs.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

In this course, students are guided by:

- Using different examples.
- Using different styles of discussion that aim to connect the theoretical and practical sides.
- Asking questions and giving exercises that require analysis and conclusions related to lectures.
- Encourage students to participate in discussions and do practical work.
- Encourage students to work in groups.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		



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Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	2	5% (10)	6 and 12	LO #1 to #3 and #4 to #6
	Assignments	2	5% (10)	2 and 13	LO #3 to #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #6
	Midterm Exam	1hr	10% (10)	9	LO #1 - #5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

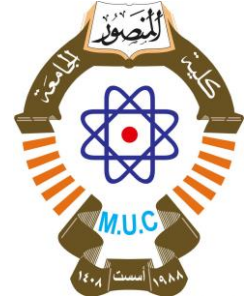
Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Microprocessor & Microcontroller.
Week 2	Architecture of Microprocessor & Microcontroller, the applications of the Microcontrollers.
Week 3	The working principle of the embedded systems and their applications.
Week 4	The working principle of the Microcontroller in DSP systems and their applications.
Week 5	Introduction to Arduino.
Week 6	Arduino Types and Applications
Week 7	Arduino Hardware Description.
Week 8	Arduino software and program structure.
Week 9	Arduino Data Types and Functions.
Week 10	Arduino Variables & Constants.
Week 11	Arduino operators.
Week 12	Control Statements and Loop.
Week 13	Functions, Time, and Libraries.
Week 14	Pulse Width Modulation.
Week 15	Arduino Projects.
Week 16	Preparatory week before the final exam



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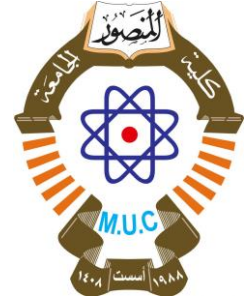
Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to Lab Equipment and Software Tools (Familiarization with laboratory equipment: Arduino, wires, Sensors, Breadboard, Resistor, LED, etc.)
Week 2	Blinking LEDs.
Week 3	Fading of LED.
Week 4	Circling of LEDs (FOR loop).
Week 5	Reading Analog Voltage and Printed out to The Serial Monitor.
Week 6	Digital Input Controlling LED using pushbutton.
Week 7	Switching ON a relay.
Week 8	Controlling LED using (Light Dependent Resistor) LDR Sensor.
Week 9	Controlling LED Using IR Remote Sensor.
Week 10	LCD Liquid Crystal Display Displaying a Message in LCD Screen
Week 11	Measure the Temperature and Humidity Using a DHT11 Sensor.
Week 12	Display the result of a DHT11 Sensor on The LCD Screen.
Week 13	Measure the Distance Using an Ultrasonic Sensor.
Week 14	Display the Result of Ultrasonic Sensor on The LCD Screen.
Week 15	Advanced projects.



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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> ▪ Arduino Tutorials Point. ▪ Practical Arduino Cool Projects for Open Source Hardware. 	No
Recommended Texts	Arduino Cookbook: Recipes to Begin, Expand, and Enhance Your Projects, Michael Margolis	No
Websites	https://www.arduino.cc/en/Tutorial/HomePage	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54). The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.