

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microprocessors and Applications		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar
Module Code	MIAP315		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	1
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Hassan Waheed		e-mail Hassan.a.jeiad@uotechnology.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None		e-mail None
Peer Reviewer Name	1. Dr. Zinah Jaffar 2.	e-mail	1. Zinah.j.shalchi@uotechnology.edu.iq 2.
Scientific Committee Approval Date	1 / 4 /2026	Version Number	1.0
Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester
Co-requisites module	None		Semester

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To introduce students with the architecture and operation of typical microprocessors. 2. To familiarize the students with the programming and interfacing of microprocessors. 3. To provide strong foundation for designing real world applications using microprocessors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the fundamentals of Microprocessors. 2- Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor. 3- Analyze assembly language programs. 4- Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices. 5- Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.
Indicative Contents المحتويات الإرشادية	<u>Introduction to 8086 Microprocessor</u> • 8086 pin configuration • Operating modes: minimum and maximum • 8086 software architecture • 8086 Register Organization [6 hrs] <u>Memory Devices, Circuits, and Subsystem Design</u> • Read-Only Memory • Random Access Read/Write Memories • Parity, Parity-Checker/Generator Circuit • FLASH Memory • Wait-State Circuitry • 8088/8086 Microcomputer System Memory Circuitry [8 hrs] <u>Input/output Interface Circuits and LSI Peripheral Devices</u> • Core and Special-Purpose I/O Interfaces • 82C55A Programmable Peripheral Interface • 82C54 Programmable Interval Timer • 82C37A Programmable Direct Memory Access Controller

	• Programmable Communication Interface Controllers • Keyboard and Display Interface [10 hrs] <u>Interrupt Interface of the 8086 Microprocessors</u> • Interrupt Mechanism, Types, and Priority • External Hardware-Interrupt Interface Signals • 82C59A Programmable Interrupt Controller • Software Interrupts • Nonmaskable Interrupt [6 hrs]
--	--

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Instructors will deliver in-class lectures to introduce and explain key microprocessor concepts, architectures, and interfaces. These presentations will cover theoretical foundations and practical applications. 2. Interactive Discussions: Students will be encouraged to participate in discussions that foster critical thinking and problem-solving skills. These discussions will revolve around case studies. 3. Hands-on Laboratory Work: Practical lab sessions will allow students to apply theoretical knowledge by working with hardware and simulation software. This includes analyze, design and simulate various programming based on microprocessor and its peripheral. 4. Group Projects: Students will collaborate on projects that involve designing and implementing network solutions for simulated environments. This promotes teamwork and the practical application of learned concepts, including explain and perform experiments based on interfacing microprocessor with memory and various I/O (Input/Output) devices. 5. Simulations and Virtual Labs: Utilizing advanced simulation tools and virtual lab environments to provide students with hands-on experience, especially when physical resources or access to actual equipment is limited.

	6. Use of Visuals and Multimedia: Integration of visual aids such as diagrams, and multimedia content to enhance understanding. 7. Assessment and Feedback: Regular assessments through quizzes, tests, and exams to gauge students' understanding and mastery of course content. Feedback will be provided systematically to guide students' learning processes and adjustments. 8. Practice and Revision Sessions: Dedicated sessions for practice and revision will be available to reinforce learning, address students' questions, and prepare them adequately for assessments.
--	--

Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem)		93	Structured SWL (h/w)		6
الحمل الدراسي المنتظم للطلاب خلال الفصل			الحمل الدراسي المنتظم للطلاب أسبوعيا		
Unstructured SWL (h/sem)		57	Unstructured SWL (h/w)		3
الحمل الدراسي غير المنتظم للطلاب خلال الفصل			الحمل الدراسي غير المنتظم للطلاب أسبوعيا		
Total SWL (h/sem)		150			
الحمل الدراسي الكلي للطلاب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1- #5
	Assignments	2	10% (10)	3 and 12	LO #2 and #5
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #4
Summative	Midterm Exam	2hr	10% (10)	8	LO #1 - #5

assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	8086 pin configuration
Week 2	Operating modes: minimum and maximum
Week 3	8086 software architecture 8086 Register Organization
Week 4	Read-Only Memory, Random Access Read/Write Memories
Week 5	Parity, Parity-Checker/Generator Circuit
Week 6	FLASH Memory Wait-State Circuitry
Week 7	8088/8086 Microcomputer System Memory Circuitry
Week 8	Mid-term Exam + Core and Special-Purpose I/O Interfaces
Week 9	82C55A Programmable Peripheral Interface 82C54 Programmable Interval Timer
Week 10	82C37A Programmable Direct Memory Access Controller
Week 11	Programmable Communication Interface Controllers Keyboard and Display Interface
Week 12	Interrupt Mechanism, Types, and Priority
Week 13	External Hardware-Interrupt Interface Signals 82C59A Programmable Interrupt Controller
Week 14	Software Interrupts

Week 15	Nonmaskable Interrupt
Week 16	Preparatory week before the final Exam
Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction about 8086 microprocessor and Emu8086 and Move Instruction (2 Experiments)
Week 2	Lab 2: Addressing Modes and the logical and physical address
Week 3	Lab 3: The Stack Memory
Week 4	Lab 4: Data Type and Data Define
Week 5	Lab 5: Arithmetic Instructions
Week 6	Lab 6: Logical, Shift and Rotate Instructions
Week 7	Lab 7: Jump Instructions
Week 8	Lab 8: Loop Instructions
Week 9	Lab 9: Flag Control Instructions and Interrupt Service Routine
Week 10	Lab 10: Introduction to MDA-Win8086 board
Week 11	Lab 11: The Architecture of 8255 Interface and Using Them with LEDs
Week 12	Lab 12: 8255 Interface with 7-segment Display
Week 13	Lab 13: Dot Matrix
Week 14	Lab 14: D/A Convertor
Week 15	Lab 15: A/D Convertor

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Liu & Gibson: "The 8088/8086 Microprocessor"	
Recommended Texts	Walter A. Triebel & Avatar Singh: "The 8088/8086 Microprocessors"	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	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
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work 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.