Ministry of Higher Education and
Scientific Research - Iraq
University of Diyala
College of Engineering
Department of Computer Engineering

الملحق ٤: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microprocessor**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CPE 210**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Computer Eng.		**College**	College of Engineering	
Module Leader	Royida Alhayali		**e-mail**	royida.alhayali@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Master	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Maather A. Ibrahim		**e-mail**	dr.maatheralshaibi_eng@uodiyala.edu.iq	
Scientific Committee Approval Date	02/06/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**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	Upon completion of this course, the student will be able to: 1. Understand Microprocessor architecture and pin configuration. 2. Learn the Interface technique between microprocessors and Memory. 3. Learn the interface technique between microprocessors and I/O. 4. Learn the addressing modes of microprocessors. 5. Learn different types of controllers that are used in the interface. 6. Develop executable programs by using assembly language instructions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrated the various features of the 8086 processor, memory, and I/O devices including the system bus. 2. Identify the hardware elements of the 8086 microprocessor including architecture and pin functions and programming model including registers, instruction sets, and addressing modes. 3. Create assembly language programs for the 8086 processor. 4. Apply the tools debug, TASM/ MASM. 5. Build and analyze assembly programs that depend on the interface such as traffic lights, LED displays, and timers. 6. Understand the function and use of interrupts in microprocessor systems. 7. Design a given interfacing system using concepts of memory and I/O interfacing.
Indicative Contents المحتويات الإرشادية	• Internal Architecture and Features of 8086 Microprocessor (3 hrs), • Addressing Modes of 8086 (3 hrs), • Intel 8086 Instruction Set: Data Movement Instructions, Logical and Arithmetic Instructions, Rotate and Shift Instructions (3 hrs), • Intel 8086 Instruction Set: Conditions and Loops, Array and Table Processing, String Instructions (3 hrs), • Intel 8086 Instruction Set: Interrupt instructions, Procedures (3 hrs), • Pin Configuration of 8086 Microprocessors, Minimum and Maximum modes of 8086, Clock Generator (8284A), Bus Buffering and Latching, Bus Timing (3 hrs), • Memory Interfacing: Memory Devices, Memory Address Decoding Using NAND and Decoder (3 hrs), • I/O Interfacing: Memory Mapped, I/O Mapped, Address Decoding using NAND and Decoder (3 hrs), • I/O Interfacing: I/O instructions and Data Transfer (3 hrs), • Intel 8086 Interfacing with 8255 PPI: Introduction to PPI, PPI Structure (3 hrs), • Intel 8086 Interfacing with 8255 PPI: Operation, and Programming of 8255 PPI (3 hrs), • Interrupt Processing in 8086: Interrupt Pin, Interrupt Vector Table and It's Organization (3 hrs),

	• Interrupt Processing in 8086: Software and hardware Interrupt, Interrupt Priorities (3 hrs), • A/D and D/A interface, Keyboard and Display Interface (3 hrs) • DMA (3 hrs)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, homework's and examples. Practical examples helps students to understand the course material.

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	**47**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**3.1**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	7 and 14	LO #2 and #5
	Assignments	2	10% (5)	11 and 13	LO #4 and #5
	Projects / Lab.	1	10% (10)		
	Report				
Summative assessment	Midterm Exam	1 hr	10% (10)	9	LO #1 - #3
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Internal Architecture and Features of 8086 Microprocessor
Week 2	Addressing Modes of 8086
Week 3	Intel 8086 Instruction Set: Data Movement Instructions, Logical and Arithmetic Instructions, Rotate and Shift Instructions
Week 4	Conditions and Loops, Array and Table Processing, String Instructions
Week 5	Interrupt instructions, Procedures
Week 6	Pin Configuration of 8086 Microprocessors, Minimum and Maximum modes of 8086, Clock Generator (8284A), Bus Buffering and Latching, Bus Timing
Week 7	Memory Interfacing: Memory Devices , Memory Address Decoding Using NAND and Decoder
Week 8	I/O Interfacing : Memory Mapped, I/O Mapped, Address Decoding using NAND and Decoder
Week 9	I/O Interfacing: I/O instructions and Data Transfer
Week 10	Intel 8086 Interfacing with 8255 PPI: Introduction to PPI, PPI Structure
Week 11	Intel 8086 Interfacing with 8255 PPI: Operation, and Programming of 8255 PPI
Week 12	Interrupt Processing in 8086: Interrupt Pin, Interrupt Vector Table and It's Organization
Week 13	Interrupt Processing in 8086: Software and hardware Interrupt, Interrupt Priorities
Week 14	A/D and D/A interface, Keyboard and Display Interface
Week 15	DMA
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Computer Assembly and Parts Characteristics
Week 2	Introduction to 8086 kit and software simulation
Week 3	Programs involving data transfer instructions
Week 4	Programs involving arithmetic operation instructions like Addition and subtraction of numbers

Week 5	Programs involving the logic operation
Week 6	Code conversion
Week 7	Programs involving multiplication and division
Week 8	Programs involving bit manipulation instruction
Week 9	Programs involving shift and rotate instructions
Week 10	Programs involving branch \loop operation instructions
Week 11	Programs involving string instructions
Week 12	Arithmetic programs to find square, cube, LCM, GCD and factorial
Week 13	Program involving I/O ports
Week 14	Procedures
Week 15	Practical Examples

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	B.Brey, " The Intel Microprocessors 8086/8088, 80186/80188,80286, 80386, 80486, Pentium, and Pentium Pro processor Architecture, Programming, and Interfacing", 6th Edition, Prentic-Hall Inc., 2003	Yes
Recommended Texts	• Michael B. Karbo., *"PC Architecture. Preface"*, Denmark, Europe, 2005. • Kevin James, *"PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control*", Newnes, 2000. • Solari E., Willse G.: *" PCI Hardware and Software"*, Annabooks, 1996. • Shanley T., Anderson D.: *"PCI System Architecture"*, Addison-Wesley, 1998.	No
Websites	▪	

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.