Far Western University
Faculty of Engineering
Bachelor in Computer Engineering
(Course of Study)

Course Title: **Microprocessor**
Credit: 3
Course Code: EX 242 **Number of lecture/week**: 3
Year/Semester: Second/ Fourth **Tutorial/week**: 1
Level: Bachelor of Engineering (Computer) **Total hours**: 45

1. Course Introduction: After completion of this subject, students will be able to develop Assembly Programming and to design Microprocessor – based System

2. Course Objectives: To be familiar with Microprocessor based system, Programming and Hardware

3. Course Outline:

Specific Objectives	**Contents (Unit/Chapter)**	**Duration (Time allocated)**
Introduction to Microprocessor	**Unit 1 / Chapter 1: Introduction** 1.1 Block diagram of a Digital Computer 1.2 Microprocessor: Definition, Types, Microprocessor based system 1.3 System Bus: Definition, Types, Organization 1.4 SPC, Von – Neumann and Harvard Architecture 1.5 CU: Definition, Types, Block Diagram with operation	**[5]**
8085 MPU	**Unit 2 / Chapter 2: Programming in 8085** 2.1 Features of 8085 MPU 2.2 Pin configuration and description 2.3 Internal Architecture 2.4 Instruction and Data formats 2.5 Addressing Modes: Definition, Types, Examples 2.6 Instruction Set 2.7 Various Assembly programming examples: 2.7.1 Program related to data transfer 2.7.2 Program including Arithmetic and Logical Operations 2.7.3 Looping and Branching 2.7.4 Multiplication and Division 2.7.5 Data Conversion: Binary to BCD, BCD to Binary, Binary to ASCII and ASCII to binary	**[8]**
8086 MPU	**Unit 3 / Chapter 3: Programming in 8086** 3.1 Features and Characteristics 3.2 Pin Description and Internal Architecture	**[10]**

	3.3 Addressing Modes: Definition, Types, Examples 3.4 Assembly Language Syntax: Comments, Identifiers, Reserve Words, Statement, Directives, Operators 3.5 Instruction Set 3.6 Assembling, Linking and Execution 3.7 DOS Function: Keyword and Video Services, INT 10H and INT 21H 3.8 Various Assembly programming examples: 3.7.1 Program related to data transfer 3.7.2 Program including Arithmetic and Logical Operations 3.7.3 Looping and Branching 3.7.4 String and Table Processing 3.7.5 Data Conversion: Binary to BCD, BCD to Binary, Binary to ASCII and ASCII to binary 3.7.6 Read and Write Numbers in different formats	
Microprocessor Based System	**Unit 4 / Chapter 4: Interfacing and Processing Cycle** 4.1 Instruction Cycle and Machine Cycle 4.2 Bus Timing Diagram for various instructions in 8085 4.3 RTL: Definition, Symbol and Examples for 8085 Instructions 4.4 Memory: Definition, Types, Hierarchy 4.5 Interfacing I/O and Memory 4.5.1 Address Decoding: Definition, Types 4.5.2 Mapping: Definition, Types, Differences 4.5.3 Interface: Definition, Needs, Types, Differences 4.5.4 I/O port address decoding using NAND gate and Decoder 4.5.4 Memory (RAM, ROM) address decoding using NAND gate and Decoder 4.6 Modes of Serial Transmission: Synchronous an Asynchronous 4.7 Serial Interface: RS 232, RS 423, RS 422 4.8 Modes of Parallel Transmission 4.9 PPI Device 8255: introduction, Block Diagram, Modes of Operation, Control Word 4.10 DMA: Need, Operation, DMA Controller	**[12]**
Interrupt	**Unit 5 / Chapter 5: Interrupt Processing in Microprocessor** 5.1 Interrupt: Definition, Types, ISR 5.2 Interrupt Processing in 8085 5.2.1 Interrupt Pins, Priorities 5.2.2 Interrupt Processing 5.2.3 Interrupt Instructions: EI, DI, RIM, SIM 5.3 Interrupt Processing in 8086 5.2.1 Interrupt Pins, Priorities 5.2.2 Interrupt (Hardware and Software) Processing 5.2.3 Interrupt Vector Table (IVT)	**[5]**

Advanced Concept	**Unit 6 / Chapter 6: Additional Topics** 6.1 Parallelism 6.1.1 Real and Pseudo Parallelism 6.1.2 Fetch – Execute Overlap and Pipelining 6.1.3 Flynn's Classification 6.1.4 Resource Allocation and Interprocessor Communication 6.2 OS and Its Features 6.3 MPU Architecture Standards 6.3.1 RISC and CISC 6.3.2 Accumulator Based and General Register Based MPU 6.3.3 DSP	**[5]**

4. **Project Work**: Not Needed

5. **Tutorials:** Should be given by Subject Teacher covering various assembly programming in 8085 & 8086 and address decoding for I/O ports & memory.

6. **Practical:** There will be 10 to 12 lab exercises to program 8085 MPU in Training Kit and 8086 using MASM.

7. **References:**

1. Ramesh S Goankar, "Microprocessor Architecture, Programming. And Applications with the 8085", Prentice Hall, Latest Edition
2. Peter Abel, "IBM PC Assembly Language and Programming", Pearson Education Inc., Latest Edition
3. D V Hall, "Microprocessir and Interfacing, Programming and Hardware", Tata McGraw Hill, Latest Edition
4. William Stalling, "Computer Organization and Architecture", Prentice Hall, Latest Edition

8. **Evaluation scheme:**

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as possible as indicated in the table below:

Unit / Chapter	Hours	Marks Distribution* (Tentative)
1	5	6
2	8	10
3	10	12
4	12	18
5	5	8
6	5	6

* There may be minor variation in marks distribution.

Internal Evaluation (Marks Weightage)		Final Exam (Marks Weightage)	Total	Remarks
Assessment/Class Performance/Attendance/Quizzes/ Tutorials/Presentation	Practical			
20	20	60	100	Internal marks will be of 20 if there are practical in the course (20 marks will be allocated for Practical)