1. Course Number and Name: 220 CPE – Microprocessor and Interfacing

2. Credits and Contact Hours: 3 Credit

a. Lecture – 2 day per week at 50 minutes for 16 weeks
b. Laboratory – 1 day per week at 100 minutes for 16 weeks

3. Course Coordinator or Instructor:

Dr.Mehrez

4. Text Book:

- The X86 Microprocessors: Architecture & Programming 8086 to Pentium Lyla B. Das, Pearson Education, First edition(2010).
- R.S. Goankar, Microprocessor Architecture Programming and Applications with the 8085/8085A 5th edition.

5. Specific Course Information:

a. **Catalog Description:** The content of this course focuses on introduction of microprocessor architecture, bus organization, assembly language programming, interfacing of memory and peripheral devices and ultimately the development of microprocessor based standalone system for certain application.

b. **Prerequisites:** 120 CPE Digital Logic Design

c. **Status:** Required

6. Specific Goals for the Course:

a. Course Outcomes:

1. Define the fundamental knowledge of INTEL microprocessor architecture, registers, bus organization and Interfacing of memory and peripherals.
2. Develop an ability to identify, formulate and solve problems related to Microprocessor.
3. Develop an ability to use the techniques, skills and tools necessary for Microprocessor based applications.
4. Develop skills to think and solve problems in cooperative work with others.
5. Show respect to the teacher and classmates.
6. Demonstrate an ability to communicate ideas of microprocessor orally.

b. Student outcomes in Criterion 3 addressed by course:

Course LOs #	Map course LOs with the program LOs. (Place course LO #s in the left column and Student LO #s across the top.)											
	Student Learning Outcomes Use LOs Codes											
	a1	**a2**	**b1**	**b2**	**b3**	**b4**	**c1**	**c2**	**c3**	**c4**	**d1**	**d2**
1	√											
2			√									
3							√					
4								√				
5									√			
6												√

7. List of Topics: 220 CPE – Microprocessor and Interfacing

List of Topics for Theory:

- **Introduction to computer architecture** - Introduction to microprocessor, Organization & architecture of 8085 Microprocessor, functional block diagram, registers, ALU, bus systems, timing and control signals..
- **8085 instruction set &Programming:**Instruction, set-data transfer, arithmetic operations, logic operations and branch operations. Programming techniques-looping, counting and indexing. Additional data transfer and 16-bit instructions. Arithmetic operations related to memory. Logic operations- rotate, compare and debugging.
- **The 80x86 computer architecture:**Processor instructions: operation (op) codes, operands Registers, Arithmetic logic unit (ALU), Input/output (I/O), Instruction register and decoder, Program counter (PC) and memory address register, Instruction execution cycle, Program execution time.
- **CPU Architecture Details:** Processor registers: accumulators, address registers, stack pointer (SP), index registers, condition code register, Flag bits: zero, sign, carry, overflow, Programmer's model.
- **Addressing Modes for the 80x86:**Instruction forms, Addressing Modes: Register addressing mode, Immediate addressing mode, Direct addressing mode, Register Indirect addressing mode, Base plus index addressing mode, Register Relative addressing mode, Base Relative Plus Index addressing mode.
- **Instruction Set for the 80x86:** Data Transfer Instructions, Arithmetic Instructions, Logic Instructions, Comparison Instruction, Jump Instructions.
- **Computer Buses and I/O:** I/O addressing: memory mapped vs. I/O mapped, Address decoding: full vs. partial , Simple I/O devices: switches, displays (LED, 7-segment), buzzer, 8255, 8253.

List of Topics for Laboratory:

- Introduction to 8085 block diagram, registers, 8085 Simulator
- Most commonly used 8085 instructions, Basic programs on 8085 Microprocessor
- Introduction to 8086 block diagram, General structure of assembly program
- Programs on data transfer instructions using 8086 Microprocessor
- Programs on Arithmetic instructions using 8086 Microprocessor
- Programs on logical instructions using 8086 Microprocessor
- Programs based on Rotate, Branch and Loop Instructions using 8086 Microprocessor
- Programs to find the length of the string and display a string using 8086 Microprocessor & Home Work-1
- Programs in operations on array using 8086 Microprocessor
- Interfacing Timers with 8086 Microprocessor & Home Work-2
- Interfacing 7-Segment Display with 8086 Microprocessor
- Interfacing a Stepper motor with 8086 Microprocessor