

# (CS-430) - Microprocessor Programming and Interfacing

## Course Outline:

### Theory:

#### 1. Introduction

1. Computer Architecture
2. Instruction Cycle
3. Memory Organization.
4. Memory Address decoding.
5. Memory Hierarehy.
6. Interrupts.
7. Bus Arbitration Schemes.
8. Programmed I/O.
9. Interrupt-Driven I/O.
10. Direct Memory Access.
11. General Purpose and Special Purpose Processors,
12. Internal Registers.
13. Internal Bus Architecture.
14. Pin Functions.
15. Addressing Modes

#### 2. Instruction Set Architecture:

1. Data Transfer Instructions.
2. Arithmetic & Logic Instruction.
3. Branch (Instruction).

#### 3. Assembly programming:

1. Testing Assembly Directives.
2. Macros.
3. Procedures.
4. Instruction Encoding.

#### 4. Microcontroller peripherals:

1. Bus Cycles,
2. Reset Circuit
3. Clock Generation Circuit
4. Wait States.
5. Memory Interfacing
6. Memory Speed Requirements
7. I/O Interfacing
8. Programmable Peripheral Interface.
9. Programmable Interval Timer,
10. Programmable Interrupt
11. Controller, Microprocessor System Design,

#### 5. Microcontroller Architectures:

1. MIPS
2. AVR
3. x86
4. ARM

## List of Practicals:

1. To demonstrate the hardware of microcontrollers and microprocessor
2. To use Proteus and Multisim simulating software for simulation
3. To use Keilmicro vision software for assembly and c programming
4. To generate List and Hex files

5. To interface and simulate ports of microcontroller (General)
6. To interface and simulate LEDs
7. To interface and simulate seven segments
8. To interface and simulate monochrome LCD
9. To program and perform ADC
10. To program and perform DAC
11. To connect external memory elements with microcontroller
12. To program and perform DC motor interfacing and PWM
13. To program and perform serial communication (RS232)
14. To program and perform parallel communication (RS232)

### **Suggested Teaching Methodology:**

- Lecturing
- Written Assignments Report Writing

### **Suggested Assessment:**

#### **Theory (100%)**

- Sessional (20%)
- Quiz (12%)
- Assignment (8%)
- Midterm (30%)
- Final Term (50%)

#### **Laboratory (100%)**

- Labs
- Open-Ended Labs

### **Recommended Text and Reference Books:**

1. Barry B. Brey, The Intel Microprocessor, 8th ed. 2009, ISBN-10: 0135026458
  2. Roger L. Tokheim, Schaum's Outline of Theory and Problems of Microprocessor Fundamentals, Graw Hill Co., 1983, ISBN: 9780070649583
  3. Douglas. V. Hall, Microprocessor and Interfacing, Programming and Hardware, Mc. Graw Hill Co., 1986
  4. Scott Mackenzie, "The 8051 Microcontroller", Prentice Hall, ISBN: 0-13- 780008-8
  5. Muhammad Ali Mazidi, PIC Microcontroller and Embedded Systems, Pearson's Prentice Hall, 2008
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