Pr.3 - MICROPROCESSOR & MICROCONTROLLER LAB
(Common to   ETC,AE&I,CSE & IT)

Total Periods	60	**Maximum Marks**	**50 Marks**
Lab. Periods:	4 Periods /week	**Term Works**	**25Marks**
Examination	**3hours**	**End Semester Examination**	**25 Marks**

A. Rationale:

The Microprocessor control has taken predominance over other types of control quite some time past. Starting from Electrical Power plant to consumer electronics this tiny chip finds extensive uses. As such Microprocessors have made pervading influence on our lives. This field is developing so rapid that it is difficult to keep track with the changes. Under this subjects Architecture and instruction sets of 8 bit and 16 bit processor have been discussed. Some applications have been included through the interfacing chips.

B. Objective:

After completion of this course the student will be able to:
1. The concept of Microprocessor 8085 (8Bit)
2. Concept of 16 Bit Processor 8086
3. Programming & Interfacing Concept
4. Develop software for microcontroller systems using a high-level programming language
5. Demonstrate familiarity with common microcontroller subsystems, such as timer modules
6. Demonstrate an ability to use both polling and interrupt-driven approaches for interfacing a microcontroller with peripheral devices
7. Develop and analyze software to interface a microcontroller with common peripheral devices, such as switches, visual displays, digital-to-analog converters, analog-to-digital converters, and flash memory to produce a system to accomplish a specified task
8. Design interfaces to external devices connected to the microcontroller using a standard bus

C. List of Practicals
NOTE: Total 14 Experiments Have To Be Completed. (4 from Gr - A ,3 from Gr - B , 4 from Gr - C, 3 from Gr - D)

Gr A) 8085(Compulsory)
1. Addition, Subtraction, Multiplication, Division of two 8 bit numbers resulting 8/16 bit numbers.
   Optional (Any three)
2. 1''s and 2's Complements
3. Binary to Gray Code / Hexadecimal to decimal conversion.
4. Logic Operations (AND, OR,) & Masking of bits
5. Time delay (Single Register, Register Pair, More than Two Register)
6. Compare between two numbers
7. Smallest /Largest number among n numbers in a given data array
8. Block Transfer of data

Gr B) 8086(Compulsory)
1. Addition, subtraction, Multiplication, Division of 16 bit nos + 2's complement of a 16 bit no.
   Optional (Any two)
2. Marking of specific bit of a number using look-up table.
3. Largest /Smallest number of a given data array.
4. To separate the Odd and Even numbers from a given data array.

    5. Sorting an array of numbers in ascending/descending order

    6. Finding a particular data element in a given data array.

Gr-C) INTERFACING (Compulsory-any one)

1. Operation of 8255 using 8085 & 8051 microcontroller
2. Generate square waves on all lines of 8255 with different frequencies (concept of delay program)

OPTIONAL (Any Three) based on self-study

1. Study of stepper Motor and its operations (Clockwise, anticlockwise, angular movement, rotate
   in various speeds)
2. Study of Elevator Simulator
3. Generation of Square, triangular and saw tooth wave using Digital to Analog Converter
4. Study of 8253 and its operation (Mode 0, Mode 2, Mode 3)
5. Study of Mode 0, Mode 1, BSR Mode operation of 8255.
6. Study of 8279 (keyboard & Display interface)
7. Study of 8259 Programmable Interrupt controller.
8. Study of Traffic Light controller
9. Steeper Motor Controller.

Gr-D) 8051 MICROCONTROLLER (Compulsory) by self-study

    1. Initialize data to registers and memory using immediate, register, direct and indirect addressing
    mode

OPTIONAL (any two)

2. Write a Program for
2.1   Bit Digital Output-LED Interface
2.2   8 Bit Digital Inputs (Switch Interface)
3. Write a Programs for(Any one)
3.1   4 x 4 Matrix Keypad Interface
3.2   Buzzer Interface
3.3   Relay Interface
4. Write a Program for character based LCD Interface.
5. Write a Program for Analog to Digital Conversion (On chip ADC& DAC)
6. Interfacing With Temperature Sensor.
7. Write a program Stepper Motor Interface
8. Write a program   to Generate Delay Subroutine
9. 805 Timer & Counter programming –Generate Square wave