

Course Title: Instrumentation and Microprocessor Laboratory Work

Course Code: EEEG 306

Credit Hours: 1

Course Description:

The course intends to reinforce the concepts learned in microprocessor and measurement & instrumentation lecture classes that have a strong practical applications emphasis, by a series of relevant experiments carried out in the laboratory.

Course Contents:

A series of experiments to reinforce the subject matter taught in 'EEEG314: Microprocessors' and 'EPEG317: Measurement and Instrumentation'.

The following experiments can be performed for Measurement and Instrumentation:

1. Calibration of voltmeter, ammeter
2. Calibration of wattmeter
3. Testing of energy meter
4. Measurement of power using Instrument transformers (CT and PT)
5. To understand Hall sensor and its use for motor speed control
6. To provide knowledge about feedback control systems and its components
7. To provide knowledge about Thermistor property and Schmitt trigger comparator in temperature control.
8. To observe the performance of a solar photovoltaic module
9. To provide knowledge about optical encoder and use of IR LED and photodiode as motion sensor
10. Study of important sensors that are available in a vehicle

The following experiments can be performed for Microprocessor:

8-bit Microprocessor (Intel 8085)

1. Use of data transfer, arithmetic and machine control instructions and related programs
 - Program to transfer data between registers, between memory and registers, and between registers and I/O device.
 - Program to add two data and display the result at O/P device also see the effect of DAA also check the Flag register.
 - Program to subtract a datum from other and store the result at memory, also check the flag register.
 - Program to get data from input devices and display that to output device.
2. Use of logical and branch instructions and related programs
 - Program for masking a byte in a register or memory
 - Program to multiply two data
 - Program for absolute division
 - Program to get input from an input device and controlling an output device

- Program to transfer the data series from one memory block to the other
 - Program to get factorial of a number
 - Program to generate a Fibonacci series and store that at memory locations
 - Program to check negative numbers in a block of memory
 - Program to count a data byte in a data series stored in a defined block of memory
3. Use of stack & subroutines and related programs
- Program to push and pop data from memory
 - Programs to display a running LED at an O/P device with some delay
 - Program to count in hexadecimal and display at an O/P device.
 - Program for a traffic light system
4. Program for code conversion,
- Program to convert Hex number to BCD and store at memory
 - Program to convert BCD to Hex and store at memory
 - Program to convert Hex to ASCII and store at memory
 - Program to convert ASCII to Hex and store at memory

16-bit Microprocessor (Intel 8086)

5. Familiarization with 8086 simulator
- Program to add, subtract, multiply
 - Program for use of data transfer, arithmetic and logical instructions
6. Use of branch instructions and related programs
- Program to get input form an input device and control an output device
 - Program to transfer the data series from one memory block to the other
 - Program to get factorial of a number
 - Program to generate a Fibonacci series and store that at memory locations
 - Program to check negative numbers in a block of memory
 - Program to count a data byte in a data series stored in a defined block of memory
7. Use of INT 21h and INT 10h and related programs
- Program to print a string on screen
 - Program to count the character in a string and display the count at the screen
 - Program to get a character input from a keyboard and check for the matching character, and display the strings 'thank you' or 'try again'
 - Program to display a character according to one's desired color