



Semester – V

Subject Name: Application of Microprocessor and Microcontroller

Subject Code: 09EE0504

Diploma Branches in which this subject is offered: Electrical Engineering

Objective: Microcontrollers are heart of any modern-day control, measurement, protection and operation systems. Penetration of microcontroller is up to extent that the population of microcontroller is more than 20 times the population of mankind. From meters to missiles, from light control to robot control, Mobile phones to automobiles, everywhere microcontrollers are working. There are many companies who manufacture own architecture of microcontroller core. Microcontrollers are sized in terms of no of bits it can handle. Earlier version of 4bit microcontrollers used in toys to now 32-bit microcontrollers are very popular. Purpose of this subject is to introduce a basic microcontroller which is 8bit and to control different I/O devices enabling him/her to get acquainted with technology enabling an easy transfer to any other core of any number of bits.

Credits Earned: 6 Credits

Course Outcomes: After completion of this course, student will be able

1. To maintain 8085 based system and interfacing with memory
2. To describe concept of Microcontroller and memories.
3. To built simple application of microcontroller using Key board and LED.
4. To maintain microcontroller-based circuits with different display devices.
5. To apply microcontroller for applications like traffic light controller, temperature controller, SCR firing angle control.
6. To maintain Data acquisition system using DAC and ADC.

Pre-requisite of course: Basic electrical engineering and Electrical Software Skill-2

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
2	0	4	6	50	30	20	25	25	150

Contents:

Unit	Topics	Contact hours	Weightage (%)
01	Microprocessor 8085 1.1 Evolution of microprocessors 1.2 Architecture of 8085	05	18



	1.3 Pin diagram 1.4 Control signals 1.5 Multiplexing of address & Data Bus 1.6 Memory: classification and types.		
02	8085 Assembly Language Programming 2.1 Programming Model of 8085 2.2 Addressing Modes 2.3 Instruction classification, Instruction format 2.4 Instruction set 2.5 Stacks & subroutines 2.6 Assembly Language programming	08	29
03	Microcontroller Basics 3.1 Introduction and applications 3.2 Comparison between microcontrollers and microprocessors 3.3 Evolution of microcontrollers 3.4 Commercial microcontroller devices	02	07
04	8051 Architecture 4.1 Block diagram of 8051 microcontroller 4.2 Registers in 8051 4.3 General purpose or working registers 4.4 Stack Pointer and Program counter 4.5 Special function registers (SFR) 4.6 Program Status word 4.7 Data pointer (DPTR) 4.8 Timer registers 4.9 Ports 4.10 Control registers	04	14
05	8051 connections, I/O ports and memory organization 5.1 8051 pin descriptions 5.2 8051 connections 5.3 Parallel I/O ports 5.4 Memory organization	04	14
06	8051 interrupts, timer/counters and serial communication 6.1 Interrupts in 8051 6.2 Initializing 8051 interrupts 6.3 Interrupt priorities 6.4 Timers and counters, timer counter modes 6.5 Serial communication, serial communication modes	05	18
07	8051 C Assembly and Applications	24*	43

*(In lab)



Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
25%	25%	35%	15%	0%	0%

Suggested List of Experiments:

Sr. No.	Unit No.	Name of Topics	Contact Hours
1	2	Study of 8085 Simulator	2
2	2	8085 Program on data transfer instructions	4
	2	8085 Program on arithmetic instructions	4
3	2	8085 Program on logical instructions	4
4	2	8085 Program on branching instructions	4
5	4	Demonstration and study of microcontroller kit	2
6	4	Demonstration and use of software simulator / assembler for 8051	2
7	7	8051 Embedded C	6
8	5	Demonstration and testing of LED	4
9	5	Programming examples (any two) – Logical Operations	2
10	5	Programming examples (any two) use of subroutine	2
11	6	Demonstration and testing of timer/counter	2
12	7	Demonstration and testing of Keyboard Interface	2
13	7	Demonstration and testing of LCD display Interface	4
14	7	Demonstration and testing of D/A or A/D converter Interface	4
15	7	Demonstration and testing of Relay Interface	2
16	7	Demonstration and testing of Stepper motor control	2
17	7	Demonstration and testing of DC motor control	2
18	7	Demonstration of SCR firing circuit	2

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.



- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

References:

Text Books:

1. Ajay V Deshmukh, "*Microcontrollers theory and applications*" TMH, New Delhi.
2. Ayala, Kenneth J., "*The 8051 Microcontroller Architecture, Programming and Applications*", Penram International Publishing (I) Pvt. Ltd. New Delhi
3. Kenneth J Ayala, "*8051 microcontrollers architecture, Programming and Applications*", International Thomson publishing, India
4. B. Ram, "*Microprocessor & Microcomputer*", S. Chand publications
5. Ramesh Gaonkar, "*Microprocessor Architecture, Programming, and Applications with the 8085*", Penram International Publishing (India) Pvt. Ltd.

Supplementary Resources:

1. www.keil.com/
2. www.allaboutcircuits.com
3. www.nmbtc.com
4. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course_home1_1.htm
5. https://onlinecourses.nptel.ac.in/noc18_ec03/preview
6. <http://8052mcu.com/tutorial>