



Semester – V

Subject Name: Application of Microprocessor and Microcontroller

Subject Code: 09EE2504

Diploma Branch in which this subject is offered: Electrical Engineering

Objective: The ubiquity of microcontrollers in modern control, measurement, protection, and operation systems cannot be overstated. Their prevalence is such that the population of microcontrollers exceeds that of mankind by more than 20 times. Microcontrollers are integral components in devices ranging from everyday appliances like meters and mobile phones to sophisticated systems such as missile guidance and robot control. Numerous companies produce their own microcontroller architectures, with varying bit sizes ranging from earlier 4-bit versions used in toys to the highly popular 32-bit microcontrollers. This subject is designed to provide students with an introduction to a basic 8-bit microcontroller and the skills to control different input/output devices. This foundation will enable them to quickly adapt to other microcontroller cores with any number of bits. Ultimately, students will acquire a fundamental understanding of microcontroller technology, allowing them to interface with I/O devices and develop simple control applications.

Credits Earned: 4 Credits

Course Outcomes: After completion of this course, the 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	4	50	30	20	25	25	150



Contents:

Unit	Topics	Contact hours	Weightage (%)
1	Microprocessor 8085 <ul style="list-style-type: none">• Introduction• Evolution of microprocessors• Architecture of 8085• Pin diagram• Control signals• Multiplexing of address & Data Bus• Memory: classification and types.	05	18
2	8085 Assembly Language Programming <ul style="list-style-type: none">• Programming Model of 8085• Addressing Modes• Instruction classification, Instruction format• Instruction set• Stacks & subroutines• Assembly Language programming	08	29
3	Microcontroller Basics <ul style="list-style-type: none">• Introduction and applications• Comparison between microcontrollers and microprocessors• Evolution of microcontrollers• Commercial microcontroller devices	02	07
4	8051 Architecture <ul style="list-style-type: none">• Block diagram of 8051 microcontroller• Registers in 8051• General purpose or working registers• Stack Pointer and Program counter• Special function registers (SFR)• Program Status word• Data pointer (DPTR)• Timer registers• Ports• Control registers	04	14
5	8051 connections, I/O ports and memory organization <ul style="list-style-type: none">• 8051 pin descriptions• 8051 connections• Parallel I/O ports• Memory organization	04	14
6	8051 interrupts, timer/counters and serial communication <ul style="list-style-type: none">• Interrupts in 8051• Initializing 8051 interrupts• Interrupt priorities• Timers and counters, timer counter modes• Serial communication, serial communication modes	05	18



7	8051 C Assembly and Applications	24*	43
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***(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
30%	30%	30%	10%	0%	0%

Suggested List of Practical/Exercise:

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
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 (anytwo) – Logical Operations	4
10	5	Programming examples (any two) use of subroutine	4
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.
- e. Show video or animation of working of various types of wiring system and electrical transmission and distribution network

References:

1. J.B. Gupta, "A Course in Electrical Installation Estimating & Costing", S. K. Kataria & Sons, 2012
2. Ajay V Deshmukh, "Microcontrollers theory and applications" TMH, New Delhi.
3. Ayala, Kenneth J., "The 8051 Microcontroller Architecture, Programming and Applications", Penram International Publishing (I) Pvt. Ltd. New Delhi
4. Kenneth J Ayala, "8051 microcontrollers architecture, Programming and Applications", International Thomson publishing, India
5. B. Ram, "Microprocessor & Microcomputer", S. Chand publications
6. 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>