

COURSE TITLE : MICROCONTROLLER AND INTERFACING
COURSE CODE : 4043
COURSE CATEGORY : A
PERIODS/WEEK : 5
PERIODS/SEMESTER : 70
CREDITS : 5

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Introduction to 8051 microcontroller	18
2	Assembly language programming and interrupts	18
3	Timers, serial communication	17
4	Interfacing of 8051	17
TOTAL		70

Course General Outcome:

MODULE	GO	ON COMPLETION OF THE STUDY OF THIS COURSE THE STUDENTS WILL BE ABLE :
1	1	To understand the architecture of 8051 microcontroller
2	2	To understand assembly language programming
	3	To understand interrupt processing in 8051
3	4	To understand the working of timers
	5	To understand serial communication
4	6	To understand interfacing of 8051

GO - General Outcome

On the completion of the study the student will be able:

MODULE I INTRODUCTION TO 8051 MICROCONTROLLER

1.1.0 To understand the architecture of 8051 microcontroller

- 1.1.1 To compare microprocessor and microcontroller
- 1.1.2 To list the features of 8051
- 1.1.3 To explain the internal architecture of 8051 microcontroller
- 1.1.4 To describe the pin functions of 8051 microcontroller
- 1.1.5 To compare different versions from 8031 to 8051
- 1.1.6 To explain the data memory organization in 8051
- 1.1.7 To explain the program memory organization in 8051
- 1.1.8 To describe the architecture of ports in 8051

MODULE II ASSEMBLY LANGUAGE PROGRAMMING AND INTERRUPTS

2.1.0 To explain assembly language programming

- 2.1.1 To explain the addressing modes of 8051
- 2.1.2 To explain the instruction set of 8051
- 2.1.3 To write simple programs with 8051 (program for addition, multiplication, data transfer, subtraction, port reading/writing)

2.2.0 To understand interrupt processing in 8051

- 2.2.1 To describe interrupts in 8051
- 2.2.2 To explain the interrupt types in 8051
- 2.2.3 To explain the steps involved in interrupt processing of 8051
- 2.2.4 To illustrate IE special function register
- 2.2.5 To illustrate IP special function register
- 2.2.6 To state the priority of interrupts in 8051
- 2.2.7 To write simple programs using interrupts

MODULE III TIMERS, SERIAL COMMUNICATION

3.1.0 To understand the working of timers

- 3.1.1 To explain the timers in 8051
- 3.1.2 To distinguish between timer function and counter function in 8051
- 3.1.3 To explain TMOD and TCON special function registers
- 3.1.4 To explain different modes of operation of timers
- 3.1.5 To write simple delay programs using timer

3.2.0 To understand serial communication

- 3.2.1 To state the basics of serial communication
- 3.2.2 To explain about serial data transmission and reception in 8051
- 3.2.3 To explain different serial data transmission modes
- 3.2.4 To illustrate SCON special function register
- 3.2.5 To illustrate PCON special function register
- 3.2.6 To write simple programs based on serial communication in 8051

MODULE IV INTERFACING OF 8051

4.1.0 To understand interfacing of 8051

- 4.1.1 To explain the interfacing of LCD system with 8051
- 4.1.2 To explain the interfacing of 4x4 keyboard with 8051
- 4.1.3 To explain the interfacing of 8051 with ADC and DAC
- 4.1.4 To explain the interfacing of stepper motor with 8051
- 4.1.5 To describe the interfacing of dc motor speed control with 8051
- 4.1.6 To explain the interfacing of water level indicator system with 8051
- 4.1.7 To explain the interfacing of temperature control system with 8051

CONTENTS

MODULE I

Comparison of microprocessor and microcontroller - features of 8051 - internal architecture - pin functions - comparison of different versions from 8031 to 8051 - data memory and program memory organization - port architecture

MODULE II

Assembly language programming of 8051 - addressing modes - instruction set - simple programs (program for addition, multiplication, division, data transfer, subtraction, port reading/writing) - interrupts in 8051 - interrupt types - steps in interrupt processing - IE special function register - IP special function register - priority of interrupts

MODULE III

Timers in 8051 - timer function and counter function - TMOD and TCON special function registers - different modes of operation of timers - simple delay programs using timer - serial communication - basics - serial data transmission and reception - different serial data transmission modes - SCON and PCON special function registers - simple programs based on serial communication

MODULE IV

Interfacing with 8051 - LCD system - 4x4 keyboard - ADC and DAC - stepper motor - dc motor - water level indicator system - temperature control system

TEXT BOOK

1. Subratha Ghoshal – 8051 microcontroller internals, instructions, programming and interfacing - Pearson.
2. Muhammad Ali Mazidi and Janice Gillispie Mazidi - The 8051 Microcontroller and Embedded Systems Using Assembly and C - Pearson Education- Second Edition.

REFERENCE

1. Kenneth J Ayala - The 8051 Microcontroller - Thomson - Third Edition.