COURSE TITLE : MICROCONTROLLER AND INTERFACING
COURSE CODE : 4043
COURSE CATEGORY : A
PERIODS/WEEK : 5
PERIODS/SEMESTER : 70/4
CREDITS : 5

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Introduction to 8051 Microcontroller.	16
2	Assembly Language Programming and Interrupts.	18
3	Timers, Serial Communication.	18
4	Interfacing of 8051.	18
	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 Introduction to 8051 Microcontroller

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 and Interrupts

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, Serial Communication

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 of 8051

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

Text Book

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