DIRECTORATE OF TECHNICAL EDUCATION

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

III YEAR

M SCHEME

V SEMESTER

2015 – 2016 onwards

MICROCONTROLLER

CURRICULUM DEVELOPMENT CENTRE

DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING

M – SCHEME

Course Name : Diploma in Electrical and Electronics Engineering

Subject code : 34052

Semester : V Semester

Subject title : MICROCONTROLLER

TEACHING AND SCHEME OFEXAMINATION:

Number of Weeks/ Semester : 15 weeks

Subject	Instruction		Examination			
	Hrs./ Week	Hrs./ Semester	Marks			Duration
			Internal Assessment	Board Examination	Total	
MICROCONTROLLER	6	90	25	75	100	3 Hrs

TOPICS AND ALLOCATION:

Unit	Topic	Time (Hrs.)
I	Architecture & Instruction set of 8051	19
II	Programming Examples	13
III	I/O and Timer	15
IV	Interrupt and Serial Communication	16
V	Interfacing Techniques	19
	Revision - Test	8
	TOTAL	75

RATIONALE:

The exponential growth of Engineering and Technology has benefited the mankind with

extreme sophistication and comfort. To sustain this development, continuous research and

development should take place not only in Engineering and Technology but also in Basic Science

such as Physics.

The various divisions of Physics like Optics, Acoustics, Dynamics, Semiconductor Physics,

Surface Physics, Nuclear Physics, Energy Studies, Materials Science, etc provide the Foundation

by enlightening the Fundamental facts, Principles, Laws and Correct sequence of events to

develop the Engineering and Technology field for the prosperity of human beings.

OBJECTIVES:

- On completion of the following units of syllabus contents, the students must be able to
- Explain Architecture of 8051 Microcontroller.
- Explain the functions of various registers.
- Understand interrupt structure of 8051.
- Understand serial data communication concepts.
- Understand the programming techniques.
- Explain various addressing modes.
- Write simple programs using 8051.
- Understand the block diagram and control word formats for peripheral devices.
- Understand how to interface with RS232C.
- Understand how to interface with 8255.
- Understand various application of 8051 Microcontroller

34052-MICROCONTROLLER

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
I	**ARCHITECTURE & INSTRUCTION SET OF 8051** **1.1 ARCHITECTURE OF 8051** Comparison of Microprocessor and Microcontroller - Block diagram ofMicrocontroller –Functions of each block - Pin details of 8051 – ALU –ROM– RAM – Memory Organization of 8051 - Special function registers –Program Counter – PSW register – Stack - I/O Ports – Timer – Interrupt – Serial Port – Oscillator and Clock - Clock Cycle – State - Machine Cycle –Instruction cycle – Reset – Power on Reset – Overview of 8051 family **1.2 INSTRUCTION SET OF 8051** Instruction set of 8051 – Classification of 8051 Instructions - Data transfer instructions – Arithmetic Instructions – Logical instructions –Branching instructions – Bit Manipulation Instructions	19
II	**PROGRAMMING EXAMPLES:** **2.1 ASSEMBLER AND ADDRESSING MODES** Assembling and running an 8051 program –Structure of Assembly Language –Assembler directives - Different addressing modes of 8051 **2.2 PROGRAMMES** Multibyte Addition – 8 Bit Multiplication and Division – Biggest Number / Smallest Number – Ascending order / Descending order BCD to ASCII Conversion – ASCII to Binary Conversion – Odd Parity Generator – Even Parity Generator -Time delay routines	13

III	**I/O AND TIMER:** **3.1 I/O** Bit addresses for I/O and RAM – I/O programming – I/O bitmanipulation programming. **3.2 TIMER** Programming 8051 Timers – Timer 0 and Timer 1 registers – Differentmodes of Timer – Mode 0 Programming – Mode 1 Programming - Mode 2Programming - Counter programming – Different modes of Counter – Mode 0 Programming – Mode 1 Programming -Mode 2 Programming (simple programs)	15
IV	**INTERRUPT AND SERIAL COMMUNICATION** **4.1 SERIAL COMMUNICATION** Basics of Serial programming – RS 232 Standards - 8051 connection to RS 232 – 8051 Serial Communication Programming – Programming 8051 to transmit data serially - Programming 8051 to Receive data serially. **4.2 INTERRUPT** 8051 Interrupt s – Programming Timer Interrupts – Programming external hardware interrupts – Programming the serial communication interrupt –Interrupt priority in 8051 (simple programs).	16
V	**INTERFACING TECHNIQUES** **5.1. IC 8255** IC 8255 – Block Diagram – Modes of 8255. **5.2. INTERFACING TECHNIQUES** Interfacing external memory to 8051– 8051 interfacing with the 8255 – ASM Programming – Relays – Sensor interfacing – ADC interfacing – DAC interfacing - Keyboard interfacing – Seven segment LED Display Interfacing - Stepper Motor interfacing – DC motor interfacing using PWM	19
Revision & Test		**10**

TEXT BOOKS:

1. Microcontrollers, Principles and Applications – Ajit pal – PHI Ltd., - 2011.

REFERENCE BOOKS:

- 8051 Microcontroller and Embedded Systems using Assembly and C by Mazidi,Mazidi and D.MacKinlay, 2006 Pearson Education Low Price Edition.
- Microprocessor and Microcontroller by R.Theagarajan, Sci Tech Publication, Chennai.