

# GUJARAT TECHNOLOGICAL UNIVERSITY

## DIPLOMA IN INSTRUMENTATION & CONTROL

### SEMESTER- VI

Subject Name: **MICROCONTROLLERS**

Sr. No.	Subject Content	Hrs.	Pract. Hrs.
1	<b>1.0 MICROPROCESSORS AND MICRO CONTROLLERS</b> 1.1 Introduction to Microcontroller 1.2 Block diagram of a Microcontroller 1.3 Comparison between Microprocessors and Microcontrollers 1.4 Microcontroller Families	4	--
2	<b>2.0 THE 8051 MICROCONTROLLER ARCHITECTURE</b> 2.1 Introduction 2.2 8051 microcontroller hardware – block diagram and function of each block 2.3 8051 Programming model 2.4 8051 DIP Pin assignment 2.5 8051 oscillator and clock 2.6 Program counter and data pointer 2.7 A and B CPU registers 2.8 Flags and PSW (Program Status Word) Register 2.9 Internal memory and Internal RAM organization 2.10 Stack and stack pointer 2.11 Special function registers 2.12 Internal ROM 2.13 Input /Output Pins, Ports and Circuits 2.14 External Memory Interfacing 2.15 Counters and Timers 2.16 Serial Data input / output 2.17 Interrupts Handling	17	6
3	<b>3.0 MOVING DATA</b> 3.1 Introduction 3.2 Addressing Modes 3.3 External Data Moves 3.4 Code memory Read-only Data Moves 3.5 Push and Pop opcodes 3.6 Data exchanges 3.7 Example programs	8	6

4	<b>4.0 LOGICAL, ARITHMETIC OPERATIONS , JUMP AND CALL INSTRUCTIONS</b> 4.1 Introduction 4.2 Byte level logical operation 4.3 Bit level logical operation 4.4 Rotate and swap operation 4.5 Flags 4.6 Incrementing and decrementing 4.7 Additions 4.8 Subtraction 4.9 Multiplications and division 4.10 Decimal arithmetic 4.11 Jump and call program range, Jumps 4.12 Calls and subroutines 4.13 Interrupts and returns 4.14 Example programs	11	10
5	<b>5.0 8051 MICRO CONTROLLER DESIGN</b> 5.1 Introduction 5.2 Microcontroller specifications 5.3 A Microcontroller design 5.4 Testing the Design 5.5 Timing Subroutines 5.6 Lookup table for 8051 5.7 Serial data transmission	8	2
6	<b>6.0 APPLICATIONS</b> 6.1 Interface Keyboard with 8051 based microcontroller 6.2 Interface LED & LCD display with 8051 based microcontroller 6.3 Interface Analog to Digital converters with 8051 based microcontroller 6.4 Interface Digital to Analog converters with 8051 based microcontroller	8	4
	<b>Total</b>	<b>56</b>	<b>28</b>

**Note :- Above are the minimum experiences required, but the college can do more experiences if possible.**

## Reference Books:

1. The 8051 Microcontroller Architecture, Programming and Applications –  
Kenneth J. Ayala (Penram International Publishing)
2. 8051 Microcontrollers MCS 51 Family And Its Variants –  
Satish Shah (Oxford University Press)
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C –  
Mazidi, Mazidi and McKinlay (Pearson)