



## C.U.SHAH UNIVERSITY

**FACULTY OF:** - Technology & Engineering

**DEPARTMENT OF:** -Electrical Engineering

**BRANCH:** Electrical Engineering

**SEMESTER:** - IV

**COURSE:-** B.Tech

**CODE:** - 4TE04MCI1

**NAME** –Microcontroller & Interfacing

### Teaching & Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE04MCI1	Microcontroller & Interfacing	4	0	2	6	5	30	1.5	70	3	30	20	---	150

### Objectives

- To understand the basic fundamental & needs of microprocessor & microcontroller.
- To understand the different types of programming language.
- To understand the basic architecture of microcontroller & peripheral circuits.
- To develop basic programming skills using assembly language.
- To develop programming skills to implement in various real life application.

### Prerequisites

- Basic of Digital Circuits and Computer Programming

### Course Outlines

Sr. No.	Course Contents	No Of Hours
1	<b>8085 Microprocessor :</b> Introduction to Microprocessor, Microprocessor systems with bus organization, Microprocessor Architecture & Operations, Memory, I/O Device, Memory and I/O Operations, Pin Diagram and Functions, Demultiplexing Of Buses, Generation Of Control Signals, Instruction Cycle, Machine Cycles, T-States, Memory Interfacing.	8
2	<b>Introduction to MCS 51Families:</b> Digital system Organization, Interfacing other logic families,MC51 Architectures, Data Transfer Schemes, MC51 based systems, the presiders, basic Building Block of x51, 8051 Hardware Overview, Architecture, Memory Organization, Special Function registers, I/O Ports, Accessing External Memory, Timer/ Counters, Serial Port Interface, Interrupt structure, Enhance Architecture, Overview AT89C2051	10

	Flash Controller, Characteristics, Pin Layout, Memory Organization, Modes operations, High speed Derivatives, AT89C52, PIC8F4431 Controller, AD $\mu$ C842 Flash Controllers(SX FAMILY)	
3	<b>Assembly Language Programing:</b> Software Development, Assembly language Programming, Assembler Directives, Classification, Addressing modes, operand modifiers, Instructions set, Programming Examples, Simple Programs, Arithmetic Operation, C-C Compiler, Downloading Program for Execution, <b>Advanced Programming Techniques:</b> Floating Point Representation, Code Converters, Array handlings, counters and delays, Handling subprograms and subroutine subprograms,	10
4	<b>External Peripheral Devices:</b> Sensors, Input Devices, switches/keys, relays, keypad, matrix keyboard, analog to digital converters, Output devices, LED Display, LCD, Stepper Motor, Memory Elements, Types of memory, structure, decoding	6
5	<b>Interfacing Parallel Devices</b> 8255 programmable peripheral Interface, Programmable Interval Timers timers(8253/8254), Real time Clock with RAM:DS1287, Programmable KBD/Display Interface	8
6	<b>Interfacing serial Devices:</b> USART:8251, Serial Interface Standards RS-232 Ports, Signal Levels, Limitations, characteristics of RS-232c, Current Loop, EIA-485, Universal Serial Bus(USB), USB to RS-232 Interface, Modems, Smart Modems, Microcomputer modems, GSM Modem.	6
7	<b>System Design:</b> On chip Parallel I/O Ports, on-chip timers, on-chip serial port and applications and examples.	4

### Learning Outcomes

- Students should be able to design a single board microcontroller based system for a particular application

### Books Recommended

- Microcontroller MCS 51 Family and Its Variants by S. K. Shah , , Oxford University Press,.
- Microprocessor Architecture, Programming, and Applications with the 8085 by Ramesh S. Gaonkar Pub: Penram International.
- Microcomputers and Microprocessors: The 8080,8085 and Z-80 Programming, Interfacing and Troubleshooting by John E. Uffenbeck., PHI Publication
- Microprocessor and Microcontroller fundamentals. The 8085 and 8051 Hardware and Software by William Kleitz., PHI Publication