



# GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3160712

MICROPROCESSOR AND INTERFACING

6<sup>TH</sup> SEMESTER

**Type of course:** Core course

**Prerequisite:** Fundamentals of Digital Logic Design and Computer Organization

**Rationale:** The modern digital systems including computer systems are designed with microprocessor as central device connected to memory and I/O devices. The subject introduces the students with basics of microprocessor, microprocessor architecture and programming, interfacing microprocessor with memory and various I/O (Input/Output) devices.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	2	4	70	30	30	20	150

**Content:**

Sr. No.	Content	Total HRS	% Weight age
1	Introduction to Microprocessor, Components of a Microprocessor: Registers, ALU and control & timing, System bus (data, address and control bus), Microprocessor systems with bus organization	4	8%
2	Microprocessor Architecture and Operations, Memory, I/O devices, Memory and I/O operations	4	7%
3	8085 Microprocessor Architecture, Address, Data And Control Buses, 8085 Pin Functions, Demultiplexing of Buses, Generation Of Control Signals, Instruction Cycle, Machine Cycles, T-States, Memory Interfacing	6	12%
4	Assembly Language Programming Basics, Classification of Instructions, Addressing Modes, 8085 Instruction Set, Instruction And Data Formats, Writing, Assembling & Executing A Program, Debugging The Programs	6	13%
5	Writing 8085 assembly language programs with decision, making and looping using data transfer, arithmetic, logical and branch instructions	6	12%
6	Stack & Subroutines, Developing Counters and Time Delay Routines, Code Conversion, BCD Arithmetic and 16-Bit Data operations	6	13%
7	Interfacing Concepts, Ports, Interfacing Of I/O Devices, Interrupts In 8085, Programmable Interrupt Controller 8259A, Programmable Peripheral Interface 8255A	8	20%
8	Advanced Microprocessors : 8086 logical block diagram, segmentation, Pin functions, Minimum and maximum mode, 80286/80386: Overview and architecture, Programming model, Data types and instruction set, segments and its types, segment descriptor, descriptor table and selectors	8	15%



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## Reference Books:

1. Microprocessor Architecture, Programming, and Applications with the 8085, Ramesh S. Gaonkar  
Pub: Penram International.
2. 8086 Programming and Advance Processor Architecture, Savaliya M. T., WileyIndia
3. The 8088 and 8086 Microprocessors, Triebel & Singh, Pearson Education
4. Microprocessors and Interfacing, N. Senthil Kumar, M. Saravanan, S. Jeevanathan, S. K. Shah,  
Oxford
5. Advanced Microprocessors, Daniel Tabak, McGrawHill
6. Microprocessor & Interfacing - Douglas Hall, TMH

## Course Outcome:

Sr. No	CO Statement	Weightage
CO1	Demonstrate the various features of microprocessor, memory and I/O devices including concepts of system bus.	15%
CO2	Identify the hardware elements of 8085 microprocessor including architecture and pin functions and programming model including registers, instruction set and addressing modes.	25%
CO3	Select appropriate 8085 instructions based on size and functions to write a given assembly language program.	25%
CO4	Design a given interfacing system using concepts of memory and I/O interfacing.	20%
CO5	Demonstrate the features of advance microprocessors.	15%



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## **List of Experiments:**

Practical list should be prepared based on the content of the subject and following guidelines should be useful.

- 8085 assembly language programmes covering all the instructions.
- Interfacing practicals using I/O instructions

## **Design based Problems (DP)/Open Ended Problem:**

1. Develop an 8085 Assembly language program to implement the Booth's algorithm to multiply two 8-bit numbers.
2. Develop an 8085 Assembly language program to implement division of two 8-bit numbers.
3. Design a program for Digital Clock with format HH:MM:SS (Address and data field) using inbuilt routines of monitor program of your system.
4. Compare the microprocessor and microcontrollers from hardware and software point of view.
5. Prepare a detail report on evaluating overall performance of a microprocessor chip.

## **Major Equipment:**

- 8085 based microprocessor kit
- Modern desktop PC with open source 8085 Simulator

## **List of Open Source Software/learning website:**

- Open source simulator for 8085 processor
- [www.nptel.ac.in](http://www.nptel.ac.in)
- [www.intel.com](http://www.intel.com)
- [www.cpu-world.com](http://www.cpu-world.com)



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