



# GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3720733

Semester – II

Subject Name: ADVANCED MICRO-CONTROLLER BASED SYSTEMS

Type of course:

Prerequisite:

Rationale:

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
1	<ul style="list-style-type: none"><li>Basic Computer Organization</li><li>Accumulator based Processes-Architecture</li><li>Memory Organization-I/O Organization</li></ul>	6
2	<ul style="list-style-type: none"><li>Micro-Controllers-Intel 8051,</li><li>Intel 8056- Registers, Memories</li><li>I/O Ports, Serial Communication</li><li>Timers, Interrupts, Programming</li></ul>	8
3	<ul style="list-style-type: none"><li>Intel 8051 – Assembly language programming</li><li>Addressing-Operations</li><li>Stack &amp; Subroutines</li><li>Interrupts-DMA</li></ul>	8
4	<ul style="list-style-type: none"><li>PIC 16F877- Architecture Programming</li><li>Interfacing Memory/ I/O Devices</li><li>Serial I/O and data communication</li></ul>	8
5	<ul style="list-style-type: none"><li>Digital Signal Processor (DSP)</li><li>Architecture – Programming</li><li>Introduction to FPGA</li></ul>	6
6	<ul style="list-style-type: none"><li>Microcontroller development for motor control applications</li><li>Stepper motor control using micro controller</li></ul>	6

Reference Books:

1. John.F.Wakerly: “Microcomputer Architecture and Programming”, John Wiley and Sons 1981



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2. Raj Kamal: "The Concepts and Features of Microcontrollers", Wheeler Publishing, 2005
3. Kenneth J. Ayala, "The 8051 microcontroller", Cengage Learning, 2004
4. John Morton, "The PIC microcontroller: your personal introductory course", Elsevier, 2005
5. Dogan Ibrahim, "Advanced PIC microcontroller projects in C: from USB to RTOS with the PIC18F Series", Elsevier, 2008
6. Microchip datasheets for PIC16F877

### Course Outcomes:

After learning the course the student should be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Develop applications based program in assembly or other higher level language.	20
CO-2	Configure different peripheral as per application requirement.	30
CO-3	Compile and debug the program.	30
CO-4	Interface microcontroller with electric machine for real time control.	20

### List of Experiments:

1. To study basic computer organization.
2. To study architecture of 8051 microcontroller.
3. To study various addressing modes of 8051 microcontroller.
4. To study interrupts of 8051 microcontroller.
5. Write 8051 microcontroller program to perform basic arithmetic and logical operations.
6. Write 8051 microcontroller program for subroutine.
7. To study architecture of 16F877 microcontroller.
8. To study architecture of Digital Signal Processor.
9. To study basics of FPGA.



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10. To develop microcontroller based application using appropriate software tool.
11. To interface microcontroller with external device/equipment for controlling purpose.

### Major Equipment:

- ✓ Simulation software like KEIL, MATLAB along with necessary toolbox, PSIM or Scilab
- ✓ 8051 Microcontroller trainer kit.
- ✓ PIC 16F877 Microcontroller trainer kit.
- ✓ FPGA trainer kit.
- ✓ Sensors, machine and other equipments.

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

1. Courses available through NPTEL.  
- website : [nptel.ac.in](http://nptel.ac.in)