Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India

(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
ETC501	**Microcontroller & Applications**	4	-	-	4	-	--	4
		Examination Scheme						
		ISE		**MSE**		**ESE**		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes	ETC303: Digital electronics
	ETC403: Microprocessor and Peripherals
After successful completion of the course, student will be able to	

Course Outcomes	CO1	Ability to describe the architecture and the software aspects of microcontroller 8051and ARM7.
	CO2	Interface various peripheral devices to the microcontroller 8051.
	CO3	Write assembly language programs for microcontroller 8051 and ARM7.
	CO4	Design microcontroller 8051 based system for various applications.

Module No.	Unit No.	Topics	Ref.	Hrs.
1		**8051 Microcontroller**	1,2	**12**
	1.1	Comparison between Microprocessor and Microcontroller		
	1.2	Features, architecture and pin configurations		
	1.3	CPU timing and machine cycle		
	1.4	Input / Output ports		
	1.5	Memory organization		
	1.6	Counters and timers		
	1.7	Interrupts		
	1.8	Serial data input and output		
2		**8051 Assembly Language Programming.**	1,2	**08**
	2.1	Instruction set		
	2.2	Addressing mode		
	2.3	Assembler directives		
	2.4	**Programs related to:** arithmetic, logical, delay, input, output port, serial communication, and interrupts		
3		**8051 Interfacing and Applications**	1,2	**12**
	3.1	Interfacing of display: LED, LCD, and seven segment display		
	3.2	Keyboard Interfacing		
	3.3	Interfacing of ADC and DAC (0808/09)		

	3.4	Stepper motor and relay		
	3.5	Connection to RS 232 for serial communication		
	3.6	Manual and auto reset		
	3.7	IR based wireless communication system design		
4		**ARM7: A 32-bit Microcontroller**	4	**08**
	4.1	The RISC design philosophy		
	4.2	Concept of Cortex-A, the Cortex-R, and the Cortex-M		
	4.3	Features of ARM Microcontroller		
	4.4	Operating modes		
	4.5	Architecture (ARM core dataflow model)		
	4.6	Registers		
	4.7	Current program status register		
	4.8	Pipeline		
	4.9	Exceptions, interrupt and vector table		
	4.10	Memory management		
	4.11	ARM7 processor families		
5		**ARM7 Programming**	4	**08**
	5.1	Instruction set for data processing, branching, load-store, software interrupt,and program status register		
	5.2	Addressing modes		
	5.3	Programming for ARM7		
6		**Introduction to Embedded Systems**	5,6	**04**
	6.1	Concepts of embedded systems		
	6.2	Optimizing design matrices and common design matrice		
	6.3	Study of embedded systems 1) Digital camera 2) Stepper motor controller.		
			Total	**52**

References

1. M. A. Mazidi, J. G. Mazidi and R. D. Mckinlay, "*The 8051 Microcontroller & Embedded systems*", Pearson Publications, Second Edition 2006.

2. C. Kenneth J. Ayala and D. V. Gadre, "*The 8051 Microcontroller & Embedded system using assembly & 'C'* ", Cengage Learning, Edition 2010.

3. Satish Shah, "*The 8051 Microcontrollers",* Oxford publication first edition 2010.

4. Andrew Sloss, Dominic Symes, and Chris Wright, "*ARM System Developer's Guide*" Morgan Kaufmann Publishers, First Edition 2004.

5. James A. Langbridge, "*Professional Embedded Arm Development*", Wrox, John Wiley Brand& Sons Inc., Edition 2014

6. Frank Vahid& tony Gavages "*Embedded system design – A unified hardware / software*