



C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: Technology & Engineering
DEPARTMENT OF: Instrumentation & Control Engineering
SEMESTER: VII
CODE: 4TE07AME1
NAME: AVR Microcontroller & Embedded Systems

Teaching & Evaluation Scheme

Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
		Th	Tu	Pr	Total		Theory				Practical			Total Marks
							Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE07AME1	AVR Microcontroller & Embedded Systems	4	0	2	6	5	30	1.5	70	3	--	20	30	150

OBJECTIVES:

1. To introduce the students to the field of embedded systems.
2. To develop programming skills to implement in various real life application.
3. To make the students aware regarding interfacing of various I/O devices, and various programming techniques for AVR microcontroller.

PREREQUISITES:

1. Basics of Microprocessors.
2. Basics of Digital Circuits.

COURSE OUTLINES:

Sr. No.	Course Contents	No Of Hours
1	Introduction To AVR Microcontroller : Microcontrollers and Embedded processors, Overview of AVR family, AVR Microcontroller architecture, Registers, AVR status register, ROM space and other hardware modules, ATmega32 pin configuration & function of each pin.	10
2	Programming in Assembly Language: Addressing modes of AVR, Data transfer, Arithmetic, Logic and Compare, Rotate and Shift, Branch and Call instructions. AVR data types and assembler directives, AVR assembly language programs, AVR I/O Port Programming, Time delay loop, BCD, ASCII conversion Program, Look-up table, Bit addressability, MACROS.	14

3	Programming in C Language: Data types, I/O programming, logic operations, Intel HEX file, Timer programming in assembly and C, Interrupt programming in assembly and C, Serial Port programming in assembly and C.	14
4	Peripheral Interfacing : LCD and Keyboard Interfacing, ADC, DAC and sensor interfacing, Relay, Opto-isolator and Stepper Motor Interfacing, Input capture and Wave Generator, PWM programming and DC motor control, SPI protocol and Display interfacing, I2C Protocol and RTC interfacing	14

Learning Outcomes:

1. The students would be able to design Embedded circuits using AVR microcontroller for various applications.

BOOKS RECOMMENDED:

1. The AVR Microcontroller and Embedded Systems Using Assembly and C, By Muhammad Ali Mazidi, Sarmad Naimi and Sepehr Naimi, Pearson Education.
2. Programming and Customizing the AVR Microcontroller, By Dhananjay Gadre, McGraw Hill Education.
3. AVR ATmega32 data sheet.