



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

EMBEDDED SYSTEMS PROGRAMMING LABORATORY								
I Semester: M.TECH - ES								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
BESD11	CORE	3	-	-	3	40	60	100
Contact Classes: 48		Tutorial Classes: Nil			Practical Classes: Nil		Total Classes: 48	
Prerequisite:								

I. COURSE OVERVIEW:

This course outlines the design and implementation of embedded systems using suitable hardware and Keil Embedded C software tools. The instruction set, Embedded C programming for I/O and memory interfacing techniques are covered. The hands-on experience acquired by the student's during the course makes them to carry out processor/controller-based projects and extend their knowledge on the latest trends and technologies in the field of embedded system.

II. COURSES OBJECTIVES:

The students will try to learn

- I. Use embedded C for reading data from port pins.
- II. The interfacing of data I/O devices with microcontroller.
- III. The serial communication and port RTOS on microcontroller

III. COURSE OUTCOMES:

At the end of the course students should be able to:

- CO 1 Make use of emulators and cross compilers for writing, compiling and running an embedded C language programs on training boards.
- CO 2 Develop Embedded C language programs for accomplishing code to reading the data from ports, blinking the LED and interfacing of switch and buzzer and temperature sensors to the microcontrollers.
- CO 3 Select suitable RTOS of microcontroller and write Embedded C language program to run 2 to 3 task simultaneously.
- CO 4 Choose serial or parallel communication for transmitting the data between microcontroller and peripherals.
- CO 5 Utilize the Analog to Digital and Digital to Analog converters with micro-controller for data conversion.
- CO 6 Build an interface between microcontroller and peripheral to provide solutions to the real world problems.

IV. LIST OF EXPERIMENTS:

Week-1: LED BLINKING

Program to toggle all the bits of port P1 continuously with 250ms delay.

Week-2: INTERFACING OF SWITCH AND BUZZER

Program to interface a switch and a buzzer to two different pins of a port such that the buzzer should sound as long as the switch is pressed.

Week-3: INTERFACING OF LCD

Program to interface LCD data pins to port P1 and display a message on it.

Week-4: INTERFACING SEVEN SEGMENT DISPLAY

Program to interface seven segment display.

Week-5: INTERFACING OF KEYPAD

Program to interface keypad. Whenever a key is pressed, it should be displayed on LCD.

Week-6: SERIAL COMMUNICATION

Program to transmit message from microcontroller to PC serially using RS232. Program to receive a message from PC to microcontroller serially using RS232

Week-7: INTERFACING OF STEPPER MOTOR

Program to interface Stepper Motor to rotate the motor in clockwise and anticlockwise directions. Program to toggle all the bits of port P1 continuously with 250ms delay.

Week-8: INTERFACING TEMPERATURE SENSOR

Program to read data from temperature sensor and display the temperature value.

Week-9: PORTING OF RTOS

Port RTOS on to 89V51 Microcontroller and verify. Run 2 to 3 tasks simultaneously on 89V51 SDK. Use LCD interface, LED interface, Serial communication.

Week-10: INTERFACING OF ADC

Program to convert analog signal into digital (ADC).

Week-11: INTERFACING OF DAC

Program to convert Digital into Analog (DAC).

Week-12: INTERFACING OF ELEVATOR

Program to interface Elevator.

V. Reference Books:

1. Michael J. Pont, "Embedded C", Pearson Education, 2nd Edition, 2008.
2. Nigel Gardner, "The Microchip PIC in CCS C". Ccs Inc, 2nd Revision Edition, 2002.

SOFTWARE AND HARDWARE REQUIREMENTS FOR 18 STUDENTS

SOFTWARE:

System Software: Microsoft windows/ Linux

Programming Languages: Keil Embedded C.

HARDWARE:

18 numbers of Intel Desktop Computers with 2 GB RAM Dot matrix Printers: 02