EMBEDDED SYSTEM LABORATORY

I Semester: ES							
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**	

Course Code	Category	L	T	P	C	CIA	SEE	Total
BESC11	Core	-	-	4	2	30	70	100

Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36	Total Classes: 36

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. COURSE OBJECTIVES:

The students will try to learn:
I. The 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:

After successful completion 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.	Apply
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 .	Apply
CO 3	**Select** suitable RTOS of microcontroller and write Embedded C language program to run 2 to 3 tasks simultaneously.	Apply
CO 4	**Choose** serial or parallel communication for transmitting the data between microcontroller and peripherals.	Apply
CO 5	**Utilize** the Analog to Digital and Digital to Analog converters with micro-controller for data conversion.	Apply
CO 6	**Build** an interface between micro controller and peripherals to provide solutions to the real world problems.	Analyze

LIST OF EXPERIMENTS	
Week-1	**LED BLINKING**
Program to toggle all the bits of port P1 continuously with 250 ms 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 soundas 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	
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. UseLCD 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.	
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 RAMDot matrix Printers: 02	