MICROCONTROLLERS AND PROGRAMMABLE DIGITAL SIGNAL PROCESSORS LABORATORY

I Semester: **ESD**								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
BESC12	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	4	2	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes: 36**		

I. COURSE OVERVIEW:

This course provides knowledge of basics of DSP processors and embedded C programming language. It covers the concepts like blinking an LED with software delay, system clock real time alteration using the PLL modules and controlling an LED using switch by polling method. Through laboratory experiments, students are provided learning experiences that enable them to provide in depth knowledge about embedded and DSP processors.

II. COURSE OBJECTIVES:

The students will try to learn:

I. Demonstrate Keil IDE tool for development of Embedded system.
II. The Program the interfacing of various devices with ARM using Embedded C.
III. Implementation of digital signal processing algorithms in MATLAB and C.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Make use of** Cortex-M3 development board write a assembly languageprogram for LED display in various applications	Apply
CO 2	**Analyze** the various sleep modes by putting core in sleep and deep sleepmodes using GNU tool chain	Analyze
CO 3	**Develop** an embedded C program for Temperature indication on an RGBLED and Verify the output in the Cortex-M3 kit	Apply
CO 4	**Build** an assembly code and C code to compute Euclidian distance betweenany two Points	Apply
CO 5	**Examine** various filters in C to enhance the features of given input sequence or signal	Apply
CO 6	**Design** an assembly and C code for convolution Operation using codecomposer studio (CCS).	Create

LIST OF EXPERIMENTS

Part A) Experiments to be carried out on Cortex-M3 development boards and using GNU tool chain.

Week-1	Blink an LED with software delay, delay generated using the SysTick timer.
Week-2	System clock real time alteration using the PLL modules.
Week-3	Control intensity of an LED using PWM implemented in software and hardware
Week-4	Control an LED using switch by polling method, by interrupt method and flash the LED once.
Week-5	UART Echo Test.

Week-6	Take analog readings on rotation of rotary potentiometer connected to an ADC channel.
Week-7	Temperature indication on an RGB LED.
Week-8	Mimic light intensity sensed by the light sensor by varying the blinking rate of an LED.
Week-9	Evaluate the various sleep modes by putting core in sleep and deep sleep modes.
Week-10	System reset using watchdog timer in case something goes wrong.
Week-11	Sample sound using a microphone and display sound levels on LEDs.
Part B) Experiments to be carried out on DSP C6713 evaluation kits and using Code Composer Studio (CCS).	
Week-12	To develop an assembly code and C code to compute Euclidian distance between any two points.
Week-13	To develop assembly code and study the impact of parallel, serial and mixed execution.
Week-14	To develop assembly and C code for implementation of convolution operation.
Week-15	To design and implement filters in C to enhance the features of given input sequence/signal

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