INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

MICROCONTROLLERS AND PROGRAMMABLE DIGITAL SIGNAL PROCESSORS LABORATORY							
I Semester: ES							

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
BESE12	**Core**	-	-	4	2	40	60	100

Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45	Total Classes: 45

Prerequisite: Microcontrollers and Digital Signal Processing.

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

CO1   Make use of Cortex-M3 development board write a assembly language program for LED display in Various applications

CO2   Analyze the various sleep modes by putting core in sleep and deep sleep modes using GNU tool chain

CO3   Develop an embedded C program for Temperature indication on an RGBLED and Verify the output in the Cortex-M3 kit

CO4   Build an assembly code and C code to compute Euclidian distance between any two Points

CO5   Examine various filters in C to enhance the features of given input sequence or signal

CO6   Design an assembly and C code for convolution Operation using code composer studio (CCS).

IV. LIST OF EXPERIMENTS:

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

Week-1: Blink an LED with software delay, delay generated using the Sys Tick 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: 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-11: To develop an assembly code and C code to compute Euclidian distance between any two points.

Week-12: To develop assembly code and study the impact of parallel, serial and mixed execution.

Week-13: To develop assembly and C code for implementation of convolution operation.

Week-14: To design and implement filters in C to enhance the features of given input sequence/signal

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.