PVP-19

REAL-TIME SIGNAL PROCESSING

Course Code	19EC4601B	**Year**	III	**Semester**	II
Course Category	Program Elective II	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Digital Signal Processing
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Generate waveforms using DSK for real time applications (L3)
CO2	Perform various operations using TMS320C6X DSP Processor (L4).
CO3	Implement IIR systems in Direct, Cascade and Parallel forms (L3).
CO4	Develop and realize computationally efficient algorithms on the DSP platform using FFT (L5).
CO5	Design real-time FIR and IIR filters on the DSP platform (L5).

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2							1	2	1
CO2	3	3	2	2	2							1	2	1
CO3	3	3	2	2	2							1	2	1
CO4	3	3	2	2	2							1	2	1
CO5	3	3	2	2	2							1	2	1
Average* (Rounded to nearest integer)	3	3	2	2	2							1	2	1

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Input and output with DSK**: Introduction, sampling, reconstruction aliasing, programming examples using C code, basic input and output using polling, basic input and output using interrupts. **Real time Sine wave generation:** sine wave generation using sin function call, sine wave generation with table created by Matlab, Signal Reconstruction, Aliasing and properties of the AIC23 codec, AM generation, ramp generation.	**CO1, CO2**
II	**Architecture and Instruction set of the C6x Processor: I**ntroduction, TMS320C6x architecture, Linear and Circular Addressing Mode, types of Instruction, Assembler Directives, timers, interrupts, Interrupt control registers, multi-channel buffer serial port, memory considerations, fixed and floating point format, constraints, programming examples using C, Assembly and Linear assembly.	**CO2**
III	**Finite Impulse Response Filters:** Introduction, Linear Phase FIR filters, FIR implementation using Fourier series method, FIR	**CO2,**

	implementation using window (rectangular, Hanning, Hamming, Blackman) technique, Moving Average Filter FIR Filter design using MATLAB.	**CO5**
IV	**Infinite Impulse Response Filters**: Introduction, IIR filter structure: Direct Form-I, Direct Form-II, Cascade and Parallel forms, Impulse invariance method, Bilinear transformation, IIR filter design using MATLAB.	**CO2, CO3, CO5**
V	**Fast Fourier Transform** : Introduction, development of radix-2 FFT algorithms, Decimation in time FFT algorithm, Decimation in frequency FFT algorithm, Inverse Fast Fourier transform using DIT and DIF algorithms. DFT of a sequence of real number without put in CCS graphics display window	**CO2, CO4**

Learning Resources
Text Books
1. Rulph Chassaing, Digital Signal Processing with C6713 and C6416DSK, 2/e Wiley Publications, 2005 2. DSP processor fundamentals, Architecture& Features-Lapsleyetal. S. Chand & Co.2000
Reference Books
1. Sanjay K.Mitra, Digital Signal Processing-A Computer Based Approach, 4/e, Tata McGraw Hill Publications, 2011. 2. Theory and Application of Digital Signal Processing - Lawrence R Rabiner & Bernard Gold, Prentice Hall.
e- Resources & other digital material
1. http://www.nptel.iitm.ac.in/ 2. http://www.ee.umanitoba.ca/~moussavi/dsp815/LectureNotes/index.html 3.http://cobweb.ecn.purdue.edu/~ipollak/ee438/FALL04/notes/notes.html

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