



SRM UNIVERSITY

Faculty of Engineering and Technology

DEPARTMENT OF ICE

Course Code : IC2005
Course Title : ADVANCED DIGITAL SIGNAL PROCESSING
Year& Semester : I year/IIInd semester
Course Duration : Even Semester (Jan-Apr2015)
Location : Tech Park

Faculty Details:

Name of the staff	Section	Office	Office Hours	Mail ID
Ms.B.Hemalatha	ICE -A	Tech Park	12.15-1.30	hema.b@ktr.srmuniv.ac.in

Required Text Books:

- 1) John G. Proakis and Dimitris C. Manolakis Digital Signal Processing Principles, Algorithm and Application, Prentice Hall of India, Pvt. Limited, 1996.
- 2) Digital Signal Processing –A.Nagoorkani
- 3)) Digital Signal Processing –R.Ramesh Babu

Web Resource:

- <http://www.digitalsignalprocessing.com>
- <http://www.analogfilterdesign.com>
- <http://www.dsptutor.com>
- <http://www.mathwork.in>
- www.dspguide.com
- www.elsevier.com/locate/dsp
- en.wikibooks.org/wiki/Digital_Signal_Processing
- www.dspguru.com

Prerequisite: Mathematical Tools like Laplace Transform etc., Digital Signal Processing

Objective:

- 1) To help the students to design the digital filters and implement digital filters using various structures
- 2) Transformation techniques such as Z transform and Fourier transform on the signals.
- 3) Introduction on the basics of Signals and Systems
- 4) Realization, Design and Implementation of IIR Filter, FIR Filter and Digital Filters
- 5) Learn the effects of finite register length in DSP as well as linear prediction and estimation.

Tentative test details and portions:

Cycle Test - I: Unit I

Cycle Test –II: Unit II & III

Model Exam: All five units

Assessment details

Cycletest-1	20
Model exam	25
Surprise test 1	10
Paper presentation	10
Attendance	5
Total	70

Outcomes

Students who have successfully completed this course can be

Course outcome	Program outcome
1) Introduce the fundamental principles and techniques of digital signal processing for understanding and designing new digital signal processing systems and for continued learning	1)The students can understand the types of signals, systems and the operations on the signals
2) Describes the estimation spectra of random signals that are to be processed by a discrete time filter, and to appreciate the performance of a variety of modern and	2) The students will be able to design and implement digital IIR and FIR filters
	3) This course introduce students to the hardware aspects of DSP, specifically the

<p>classical spectrum estimation techniques</p> <p>3) Brief Explanation about the various realization structures for digial IIR and FIR systems</p> <p>4) Study about the theory of modern digital signal processing and digital filter design, including hands-on experience with important techniques involving digital filter design and digital simulation experiments</p>	<p>Texas Instruments TMS320C6x processors, and their applications in digital filtering</p> <p>4) Students can understand the theory and application of Analog to Digital Conversion (A/D) techniques</p>
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Detailed Session Plan

Day	Name of the topics	Reference
1	Introduction	John G. Proakis Nagoorkani.A P.Ramesh Babu
2	Classification of Signals – periodic ,aperiodic ,Even , odd signals	John G. Proakis Nagoorkani.A P.Ramesh Babu
3	Classification of continuous time signals- discrete time signals	John G. Proakis Nagoorkani.A P.Ramesh Babu
4	Sampling Theorem-sampling-digitizing-aliasing- anti-alias filter	John G. Proakis Nagoorkani.A P.Ramesh Babu
5	Linear convolution	John G. Proakis Nagoorkani.A P.Ramesh Babu
6	Circular convolution	John G. Proakis Nagoorkani.A P.Ramesh Babu
7	Problems	John G. Proakis Nagoorkani.A P.Ramesh Babu
8	Analysis and characterization of LTI systems using Laplace transform	V John G. Proakis Nagoorkani.A P.Ramesh Babu

9	Z transform	John G. Proakis Nagoorkani.A P.Ramesh Babu
10	Inverse Z-Transform	John G. Proakis Nagoorkani.A P.Ramesh Babu
11	Discrete Fourier Transforms DFT and its properties	John G. Proakis Nagoorkani.A P.Ramesh Babu
12	Radix 2FFT	John G. Proakis Nagoorkani.A P.Ramesh Babu
13	Computational advantages of FFT over DFT	John G. Proakis Nagoorkani.A P.Ramesh Babu
14	Decimation in time FFT algorithm	John G. Proakis Nagoorkani.A P.Ramesh Babu
15	Decimation-in Frequency FFT algorithm	John G. Proakis Nagoorkani.A P.Ramesh Babu
16	MATLAB exercises	John G. Proakis Nagoorkani.A P.Ramesh Babu
17	LTI system as Frequency selective filters	John G. Proakis Nagoorkani.A P.Ramesh Babu
18	Design of digital FIR filters	John G. Proakis Nagoorkani.A P.Ramesh Babu
19	Frequency sampling method	John G. Proakis Nagoorkani.A P.Ramesh Babu
20	Fourier series method	John G. Proakis Nagoorkani.A P.Ramesh Babu
21	Blackmann Window	John G. Proakis Nagoorkani.A P.Ramesh Babu
22	Hanning Window	John G. Proakis Nagoorkani.A P.Ramesh Babu

23	Hamming Window	John G. Proakis Nagoorkani.A P.Ramesh Babu
24	Triangular Window	John G. Proakis Nagoorkani.A P.Ramesh Babu
25	Review of analog filters	John G. Proakis Nagoorkani.A P.Ramesh Babu
26	Analog Butterworth filter	John G. Proakis Nagoorkani.A P.Ramesh Babu
27	Analog Chebyshev filter	John G. Proakis Nagoorkani.A P.Ramesh Babu
28	Frequency transformations	John G. Proakis Nagoorkani.A P.Ramesh Babu
29	Design of digital IIR filters	John G. Proakis Nagoorkani.A P.Ramesh Babu
30	Bilinear transformation method	John G. Proakis Nagoorkani.A P.Ramesh Babu
31	Impulse Invariant transformation method	John G. Proakis Nagoorkani.A P.Ramesh Babu
32	Problems in Bilinear transformation method	John G. Proakis Nagoorkani.A P.Ramesh Babu
33	Problems in Impulse Invariant transformation method	John G. Proakis Nagoorkani.A P.Ramesh Babu
34	Implementation of discrete time systems	John G. Proakis Nagoorkani.A P.Ramesh Babu
35	Structures for the realization of discrete time systems	John G. Proakis Nagoorkani.A P.Ramesh Babu
36	Structures for IIR filter	John G. Proakis Nagoorkani.A P.Ramesh Babu

37	Structures for FIR filter	John G. Proakis Nagoorkani.A P.Ramesh Babu
38	Introduction to programmable DSPS	John G. Proakis Nagoorkani.A P.Ramesh Babu
39	Architecture of TMS 320 C5X	John G. Proakis Nagoorkani.A P.Ramesh Babu
40	Assembly language Instructions	John G. Proakis Nagoorkani.A P.Ramesh Babu
41	Instruction Pipelining in C5X	John G. Proakis Nagoorkani.A P.Ramesh Babu
42	Convolution using MAC and MACD Instructions	John G. Proakis Nagoorkani.A P.Ramesh Babu
43	Square wave generation	John G. Proakis Nagoorkani.A P.Ramesh Babu
44	Ramp signal generation	John G. Proakis Nagoorkani.A P.Ramesh Babu
45	Triangular wave generation.	John G. Proakis Nagoorkani.A P.Ramesh Babu