ADVANCED DIGITAL SIGNAL PROCESSING

(Elective Subject)

Course Code:	10M11EC211	Semester:	7th Semester, B. Tech (ECE)
Credits:	3	Contact Hours:	L-3, T-0,P-0

Course Objectives

At the completion of this course, the student should have in depth knowledge of processing digital signals.

Course Outcomes

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

1. Know the analysis of discrete time signals.
2. To study the modern digital signal processing algorithms and applications.
3. Have an in-depth knowledge of use of digital systems in real time applications
4. Apply the algorithms for wide area of recent applications.

Course Contents

Unit	Topics	References (chapter number, page no. etc)	Lectures
1.	Review of Discrete time signals and systems and frequency analysis of discrete time linear time invariant systems. Discrete time systems, analysis of discrete time linear invariant systems, implementation of discrete time systems, correlation of discrete time systems ,z-transforms, linear time invariant systems as frequency selective filters. Sampling	John G. Proakis	8
2.	The Discrete Fourier transforms its properties and applications. Frequency domain sampling, properties of DFT, linear filtering methods based on DFT, Frequency analysis of signals using the DFT,Radix-2 decimation in time domain and decimation in frequency domain algorithms.	John G. Proakis	8
3	Design of Digital filters, Design of FIR filters, Design of IIR filters, frequency transformations	R.Rabiner	6
4	Multirate digital signal processing, Decimation, interpolation, sampling rate conversion, filter	John G. Proakis	6

	design and implementation for multirate conversion, sampling rate conversion by an arbitrary factor, applications of multirate signal processing.		
5	Linear prediction and optimum linear filters, Forward and backward linear prediction, solution of the normal equations, wiener filters.	John G. Proakis	7
6	Power spectrum estimation, Non-parametric and parametric methods for power spectrum estimation.	John G. Proakis	7
		Total Number of Lectures	42

Evaluation Scheme

1. Test 1 :15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
    - 10 Marks : Class performance, Tutorials & Assignments
    - 10 Marks : Quizzes
    - 5 marks : Attendance

Text Books

1. Digital Signal Processing Principles, Algorithms, and Applications John G. Proakis, Prentice-Hall International.Inc, 4th Edition, 2012.

2. Theory and Application of Digital Signal Processing by Lawrence R.Rabiner and Bernard Gold.

Reference Books

1. Oppenheim, Alan V. Discrete-time signal processing. Pearson Education India, 1999.

2. Mitra, Sanjit Kumar, and Yonghong Kuo. Digital signal processing: a computer-based approach. Vol. 2. New York: McGraw-Hill Higher Education, 2006.