Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME – I Year (Spl Digital Communication) Semester- A			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
DRC1G3 Advance Digital Signal Processing	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

Course Objective: To provide clear conceptual knowledge of different DSP algorithms and to introduce speech, multimedia and other signal processing applications.
Prerequisite(s): A basic course in Digital signal processing.

COURSE CONTENTS

Unit 1
Overview of DSP,FIR filters, IIR filters, design techniques of linear phase FIR filters, IIR filters by impulse invariance, bilinear transformation, Linear prediction & optimum linear filters stationary random process, forward- backward filters linear prediction, solution of normal equation.

Unit2
Multi rate DSP, Sampling rate conversion, poly phase filters, multistage decimator & interpolator, QMF, digital filter banks,DFT in spectral estimation., Adaptive filters & spectral estimation.

Unit 3
Minimum mean square criterion, , LMS algorithm, Recursive least square algorithm,Application of DSP& Multi rate DSP Application to Radar, introduction to wavelets, application to image processing, design of phase shifters, DSP in speech processing & other applications

Unit 4
Image representation :Gray scale and color images , image sampling a nd quantization. Image enhancement: Filter in spatial and frequency domains , histogram based processing and homomorphic filtering. Edge Detection edge linking, boundary descriptors. Image Segmantation :Thresholding, region based segmentation Image Compression: lossy and lossless compression techniques.

Unit 5
Entropy coding, lossy and lossless predictive coding, uniform and non uniformquantizers, transform based compression, JPEG, Image reconstruction from projections: Principles, mathematical basis of tomography. Projections, The Fourier Slice Theorem, Reconstruction Algorithms for Parallel Projections, Three dimensional projections. Computer visualization of 3D data :Rendering techniques: Surface based and volume based techniques. Direct Volume rendering: Ray casting, opacity function. Maximum Intensity Projection

BOOKS RECOMMENDED:

[1]. Gonzalez and Woods :Digital Image Processing, Pearson Education 3rd Edition
[2]. A.K.Jain : Fundamentals of Digital image processing , PHI
[3]. J.G. Proakis and D.G .Manolakis Digital signal processing: Principles, algorithm and applications, Macmillan publishing
[4]. IfeachorE.C., Jervis B.W. Digital signal processing, a Practical approach, 2nd ed. Pearson edu. 2003.
[5]. Salivahanan, Vallavaraj&Gnanpriya Digital signal processing:: Tata Mcgraw Hill
[6]. References:
[7]. S.W.Smith Digital signal processing: A practical guide for engineers and scientists, Elsevier
[8]. S.K.Mitra , Digital signal processing:: Tata Mcgraw Hill