Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) VI Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
	L	T	P		TH	CW	SW	PR	Total
3EI354 Digital Signal Processing	4	-	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	35	25	-	-	60

Objectives: To provide the analysis techniques like for discrete time systems analyze the discrete time systems in time and frequency domain using Z- Transform and Fourier transforms to learn the signal processing tool box of MATLAB for implementing the basic problems of DSP designing of digital filters.

Prerequisite(s): Awareness about the analysis of analog signals and systems and analog filter design.

COURSE OF CONTENTS

Unit-I
Introduction to signal processing , Discrete time signals and sequence operations ,properties . Discrete time systems ,their properties ,Linear time invariant systems ,convolution ,properties of LTIV systems ,Inverse system ,Linear constant coefficient difference equations and their solutions .,MATLAB exercises

Unit-II
Frequency domain representation of discrete time signals and systems ,suddenly applied complex exponentials inputs , representation of sequences by Fourier transforms , conditions of their convergence ,symmetry properties of the FT, Fourier transform theorems, MATLAB exercises

Unit-III
Introduction to Z- transforms , ROC and their properties , Inverse Z – transform, Z-transform properties ,Initial value theorem ,structures for discrete time systems ,block diagram representation of linear constant coefficient difference equations , Direct form I ,II . signal flow graph representation of LCCDE, basic structures for IIR systems , direct forms,cascade,parallel forms ,transposed forms ,basic structures for FIR systems ,Direct form , cascade form structures for linear phase FIR systems, MATLAB exercises

Unit-IV
Representation of periodic sequences , the discrete Fourier series ,properties of DFS, Fourier transform of periodic signals ,sampling the FT, Fourier representation of finite duration sequences , the discrete Fourier transform ,properties of DFT ,symmetry properties ,circular convolution ,linear convolution using DFT, Implementing LTIV systems using DFT, MATLAB exercises

Unit-V
Efficient computation of DFT , Goertzel algorithm , decimation in time FFT algorithm, In place computation, alternative forms , decimation in frequency FFT algorithm , In place computation, alternative forms. Filter design techniques ,design of discrete time IIR filters from continuous time filters, filter design by impulse invariance , bilinear transformation ,design of FIR filters by windowing ,properties of commonly used windows, MATLAB exercises

BOOKS RECOMMENDED
[1] Oppenheim and Schafer, *Discrete time signal processin*, 2/E PHI, 2005.
[2] Proakis and Manolakis*, Discrete time signal processing*, PHI, 2005.
[3] S. Mitra, *Discrete time signal processing*, Pearson Education.

Scheme for B.E. III (Electronics & Instrumentation) effective from July 2008