22EEPE31	DIGITAL SIGNAL PROCESSING				SEMESTER			VI
PREREQUISTIES		CATEGORY		PE	Credit			3
Signals and Systems, and Control systems		Hours/Week		L	T	P		TH
				3	0	0		3
Course Objectives:								
1.	To classify signals and systems & their mathematical representation.							
2.	To analyze the discrete time systems.							
3.	To study about filters and their design for digital implementation.							
UNIT I	**INTRODUCTION TO SIGNALS AND SYSTEMS**			**9**	**0**	**0**		**9**
Classification of systems: Continuous, discrete, linear, causal, stable, dynamic, recursive, time variance; classification of signals: continuous and discrete, energy and power; mathematical representation of signals; spectral density; sampling techniques, quantization, quantization error, Nyquist rate, aliasing effect.								
UNIT II	**DISCRETE TIME SYSTEM ANALYSIS**			**9**	**0**	**0**		**9**
Z-transform and its properties, inverse z-transforms; difference equation – Solution by z transform, application to discrete systems - Stability analysis, frequency response –Convolution – Discrete Time Fourier transform , magnitude and phase representation.								
UNIT III	**DISCRETE FOURIER TRANSFORM & COMPUTATION**			**9**	**0**	**0**		**9**
Discrete Fourier Transform- properties, magnitude and phase representation - Computation of DFT using FFT algorithm – DIT &DIF using radix 2 FFT – Butterfly structure.								
UNIT IV	**DESIGN OF DIGITAL FILTERS**			**9**	**0**	**0**		**9**
FIR & IIR filter realization – Parallel & cascade forms. FIR design: Windowing Techniques – Need and choice of windows – Linear phase characteristics. Analog filter design – Butterworth and Chebyshev approximations; IIR Filters, digital design using impulse invariant and bilinear transformation - Warping, pre warping.								
UNIT V	**DIGITAL SIGNAL PROCESSORS**			**9**	**0**	**0**		**9**
Introduction – Architecture – Features – Addressing Formats – Functional modes - Introduction to Commercial DSP Processors.								
Total (45L+0T)= 45 Periods								

Text Books:	
1.	J.G. Proakis and D.G. Manolakis, 'Digital Signal Processing Principles, Algorithms and Applications', Pearson Education, New Delhi, 2006.
2.	S.K. Mitra, 'Digital Signal Processing – A Computer Based Approach', McGraw Hill Edu, 2013.
3.	Robert Schilling & Sandra L.Harris, Introduction to Digital Signal Processing using Matlab", Cengage Learning, 2014.
Reference Books:	
1.	Poorna Chandra S, Sasikala. B ,Digital Signal Processing, Vijay Nicole/TMH,2013.
2.	B.P.Lathi, 'Principles of Signal Processing and Linear Systems', Oxford University Press, 2010.
3.	Taan S. ElAli, 'Discrete Systems and Digital Signal Processing with Mat Lab', CRC Press, 2009.
4.	Sen M.kuo, woonseng…s.gan, "Digital Signal Processors, Architecture, Implementations & Applications, Pearson,2013.
E-Reference	
1.	https://nptel.ac.in/courses/108105055/34
2.	https://books.google.co.in/books?isbn=8131710009

Course Outcomes: Upon completion of this course, the students will be able to:			**Bloom's Taxonomy Mapped**
CO1	:	Understand the types of systems and signals.	L2: Understanding
CO2	:	Solve problems in digital system using Z transform.	L5: Evaluating
CO3	:	Apply Fourier transforms for processing of digital signals.	L3: Applying
CO4	:	Analyze digital systems using Fast Fourier transform.	L3: Applying
CO5	:	Design digital filters algorithms in digital signal processor platforms	L5: Evaluating

COURSE ARTICULATION MATRIX

COs/ POs	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PS O3**
CO1	1	1	1	1	1	1	2	1	1		1		1	1	1
CO2	3	3	2	1	2	1	2	1	1		1		1	1	1
CO3	3	3	3	3	2	1	3	1	1		1		1	1	1
CO4	3	3	3	3	3	1	3	1	1		1		2	2	1
CO5	2	3	3	3	3	1	3	1	1		1		2	2	1
Avg	2.4	2.6	2.4	2.2	2.2	1	2.6	1	1	0	1	0	1.4	1.4	1

3/2/1-indicates strength of correlation (3- High, 2-Medium, 1- Low)