Course (Category) Code	Course Name	Teaching Scheme (Hrs/week)					Credits Assigned			
		L	T	P	O	E	L	T	P	Total
PC	Foundation of Signal Processing	3	0	2	5	10	3	0	1	4
		Examination Scheme								
		Component	ISE		MSE		ESE			Total
IT303		Theory	50		50		100			200
		Laboratory	50		--		50			100

Pre-requisite Course Codes, if any.	
Course Objective: Foundations of Digital Signal Processing! The study of digital signal processing explores how we transform data into new representations to better understand, compress, and leverage it. The course begins with a rigorous review of tools from Signals and Systems: sampling, convolution, Fourier representations and flow graph, fast linear filtering algorithms. It also comoares DSP Processor and General Purpose Processor.	
Course Outcomes (CO): ***At the End of the course students will be able to***	
IT303.1	Interpret DT signal and perform signal manipulation in Time Domain and Frequency Domain
IT303.2	Develop FFT flow-graph
IT303.3	Implement Fast Linear filtering algorithms
IT303.4	Compare the DSP processor with General Purpose Processor (GPP)

CO-PO Correlation Matrix (3-Strong, 2-Moderate, 1-Weak Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
IT303.1	2	2		-	-	-	-	-	-	-	-	-
IT303.2	-	-	3	-	-	-	-	-	-	-	-	-
IT303.3	-	-	3	-	-	-	-	-	-	-	-	-
IT303.4	-	2	-	-	-	-	-	-	-	-	-	-

CO-PEO/PSO Correlation Matrix (3-Strong, 2-Moderate, 1-Weak Correlation)

	PEO1	PEO2	PEO3	PEO4	PSO1	PSO2	PSO3
IT303.1	-	-	-	3	-	-	-
IT303.2	-	-	-	3	3	-	-
IT303.3	-	-	-	3	3	-	-
IT303.4	-	-	-	3	-	-	-

BLOOM'S Levels Targeted (Pl. Tick appropriate)

Remember	Understand	Apply	Analyze	Evaluate	Create
		✓	✓	✓	

Theory Component

Module No.	Unit No.	Topics	Ref.	Hrs.
1	Title	**Discrete-Time Signal**	T1,T2	12
CO1	1.1	Introduction: Signals, Systems, and Signal, Continuous Time signal, Discrete - Time signal and representation, Digital signal, The Sampling theorem, Some elementary discrete time signals, Classification of Discrete - Time Signals, Modifications of Discrete - Time Signals.	T1,T2	04
Concept of Frequency Numericals on Sampling Range of Frequencies	1.2	Operations on Discrete - Time Signals: Linear Convolution, Circular Convolution, Matrix Representation of Circular Convolution, Linear Convolution using Circular Convolution, Auto and Cross Correlation.	T1,T2	05
	1.3	Discrete - Time systems: Static and dynamic, time variant and time invariant, linear and nonlinear, causal and non causal. Representation of system using impulse response, Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) system, Response of the FIR system using convolution.	T1,T2	03
2	Title	**Discrete Fourier Transform**	T1,T2	08
CO2	2.1	Introduction to DTFT, Relation between DFT and DTFT, DFT of DT signal, Inverse DFT.	T1,T2	02
	2.2	Properties of the DFT: Scaling and Linearity, Symmetry for real valued signal, Periodicity, Time Shift and Frequency Shift, Time Reversal, Convolution Property and Parsevals Energy Theorem.	T1,T2	06
3	Title	**Fast Fourier Transform**	T1,T2	08
CO2	3.1	Fast Fourier Transform: Need of FFT, Radix-2 DIT-FFT algorithm	T1,T2	04
	3.2	Flow graph for N=4 and 8 using Radix-2 DIT-FFT, Inverse FFT algorithm, Comparison of complex and real, multiplication and additions of DFT and FFT	T1,T2	04
4	Title	**DSP Algorithms**	T1,T2	08
CO3	4.1	Fast Circular Convolution Algorithm, Fast Linear Convolution Algorithm.	T1,T2	04
	4.2	Linear FIR filtering using Overlap Add Algorithm and Overlap Save Algorithm and implementation using FFT.	T1,T2	04
5	Title	DSP Processors and Applications of DSP	T3	06
CO4	5.1	Need DSP processor, Difference between DSP processor & General Purpose (GP) Processor.	T3	02
	5.2	Case study of DSP applications to Speech Signal Processing and Biomedical Signal Processing.	T3	04
6	Self Study *	Multi-rate Signal Processing: Up sampling and Down sampling, Signal Compression, Carl Correlation Coefficient for measurement of degree of similarity between two signals.	T1, T2, T3,R1 ,R2	02 02 01
CO4				
Total				42

Laboratory Component, if any (Minimum 10 Laboratory experiments are expected)

Sr. No.	Title of the Experiment	Marks
1	Signal Operations	5
2	Discrete Convolution	5
3	Discrete Correlation	5
4	Discrete Fourier Transform	5
5	Magnitude and Phase Spectrum	5
6	Fast Fourier Transform	5
7	Overlap Add Method using FFT	5
8	Overlap Save Method using FFT	5
9	Application of DSP Part I	5
10	Application of DSP Part II	5

Text Books

Sr. No.	Title	Edition	Authors	Publisher	Year
1	Digital Signal Processing : Principles, Algorithms and Applications	Fourth Edition	Proakis Manolakis	Pearson Education, ISBN 81-317-1000-9	2007
2	Digital Signal Processing	First Edition	S. Salivahanan, A. Vallavaraj, C. Gnanapriya	TataMcgraw Hill ISBN 978-0-07-066924-6	2010
3	Digital Signal Processing: A Computer Science Perspective	First Edition published on 25th Sept, 2000	Jonathan (Y) Stein	Copyright © 2000 John Wiley & Sons, Inc Print ISBN:9780471295464 |Online ISBN:9780471200598 |DOI:10.1002/047120059X	2000

Reference Books

Sr. No.	Title	Edition	Authors	Publisher	Year
1	Digital Signal Processing: A Practical Approach	--	Emmanuel C. Ifeachor, Barrie W. Jervis	Pearson Education ISBN 0-201-59619- 9	2001
2	Digital Signal Processing	Sixth Edition	P. Ramesh Babu	Scitech Publication	2014