Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
EXC504	Signals and Systems	4	1	--	4	1	--	5
		Examination Scheme						
		ISE		MSE	ESE			
		10		30	100 (60% Weightage)			

Pre-requisite Course Codes		--
After successful completion of the course, student will be able to		
Course Outcomes	CO1	Classify continuous time & discrete time signals and systems
	CO2	Apply time and frequency domain analysis techniques to different signals
	CO3	Analyze continuous time system using Laplace Transform
	CO4	Analyze discrete time system using Z- Transform

Module No.	Unit No.	Topics	Ref.	Hrs.
1		**Continuous And Discrete Time Signals And Systems**		08
	1.1	Mathematical representation, classification of CT and DT signals, arithmetic operations on the signals, transformation of independent variable	1,4	
	1.2	Mathematical representation, classification of CT and DT systems	1,4,5	
	1.3	Sampling and reconstruction, aliasing effect		
2		**Time Domain Analysis Of Continuous and Discrete Signals And Systems**		06
	2.1	Properties of LTI systems, impulse and step response.	3,4,5	
	2.2	Use of convolution integral and convolution sum for analysis of LTI systems.	3,4,5	
	2.3	Properties of convolution integral/sum.	3,4,5	
3		**Frequency Domain Analysis of Continuous Time System Using Laplace Transform**		08
	3.1	Need of Laplace transform, review of Laplace transform, properties, inverse of Laplace transform, concept of ROC, poles and zeros	1,4	
	3.2	Unilateral Laplace transform	1,4	
	3.3	Analysis and characterization of LTI system using Laplace transform: impulse and step response, causality, stability, stability of causal system	1,4	
	3.4	Block diagram representation	1	
4		**Frequency Domain Analysis of Discrete Time System Using Z Transform**		14
	4.1	Need of Z transform, definition, properties of unilateral and bilateral Z Transform, mapping with s plane, relationship with Laplace transform	3,5	
	4.2	Z transform of standard signals, ROC, poles and zeros of transfer function, inverse Z transform	3,5	

	4.3	Analysis and characterization of LTI system using Z transform: impulse and step response, causality, stability, stability of causal system	3,5	
	4.4	Block diagram representation, system realization		
5		**Frequency Domain Analysis of Continuous and Discrete Signals**		**12**
	5.1	Review of Fourier series, Discrete time Fourier series, its properties	4	
	5.2	Fourier transform, properties of Fourier transform, relationship with Laplace and Z transform	4	
	5.3	Discrete time Fourier transform, properties, frequency sampling, Discrete Fourier transform, properties	4,5	
6		**Correlation and Spectral Density**		**04**
	6.1	Comparison of convolution and correlation, Auto and cross correlation, energy/power spectral density	1	
	6.2	Relation of ESD, PSD with auto-correlation	1	
	6.3	Relationship between ESD/PSD of input and output of LTI system	1	
			Total	**52**

References:

[1] Alan V. Oppenheim, Alan S. Willsky, and S. Hamid Nawab, "Signals and Systems", Second Edition, PHI learning.

[2] Tarun Kumar Rawat, "Signals and Systems", Oxford University Press, Edition 2014.

[3] John Proakis and Dimitris Monolakis, "Digital Signal Processing", Pearson Publication, Forth Edition.

[4] A. Nagoor Kani, "Signals & Systems", McGraw Hill Education (India) Pvt Ltd, Fourteenth Edition.

[5] S.Salivahanan, A Vallavaraj, C Gnanapriya, "Digital Signal Processing", Tata McGraw Hill, First Edition.