Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
EXC504	Signals and Systems	04	--	#01	04	--	01	05

Subject Code	Subject Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test 1	Test 2	Ave. Of Test 1 and Test 2					
EXC504	Signals and Systems	20	20	20	80	25	-	-	125

#Class wise

Course Objective:

1. To provide a comprehensive coverage of continuous time and discrete time of Signals and Systems.
2. To introduce various time domain and frequency domain methods for analysis of Signals and systems.

Course Outcome:

1. Student will be able to differentiate between continuous time and discrete time of Signals and Systems.
2. Student will be able to do time domain and frequency domain analysis of Signals and systems.

Module No.	Unit No.	Topics	Hrs.
1.		**Continuous And Discrete Time Signals And Systems**	8
	1.1	Mathematical representation, classification of CT and DT signals, arithmetic operations on the signals, transformation of independent variable	
	1.2	Mathematical representation, classification of CT and DT systems	
	1.3	Sampling and reconstruction, aliasing effect	
2		**Time Domain Analysis Of Continuous and Discrete Signals And Systems**	6
	2.1	Properties of LTI systems, impulse and step response.	
	2.2	Use of convolution integral and convolution sum for analysis of LTI systems.	
	2,3	Properties of convolution integral/sum.	
3		**Frequency Domain Analysis of Continuous Time System Using Laplace Transform**	8
	3.1	Need of Laplace transform, review of Laplace transform, properties, inverse of Laplace transform, concept of ROC, poles and zeros	
	3.2	Unilateral Laplace transform	
	3.3	Analysis and characterization of LTI system using Laplace transform: impulse and step response, causality, stability, stability of causal system	
	3.4	Block diagram representation	
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	
	4.2	Z transform of standard signals, ROC, poles and zeros of transfer function, inverse Z transform	
	4.3	Analysis and characterization of LTI system using Z transform: impulse and step response, causality, stability, stability of causal system	
	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	
	5.2	Fourier transform, properties of Fourier transform, relationship with Laplace and Z transform	
	5.3	Discrete time Fourier transform, properties, frequency sampling, Discrete Fourier transform, properties	
6		**Correlation and Spectral Density**	04
	6.1	Comparison of convolution and correlation, Auto and cross correlation, energy/power spectral density	
	6.2	Relation of ESD, PSD with auto-correlation	
	6.3	Relationship between ESD/PSD of input and output of LTI system	
		Total	52

Recommended Books:

1. Alan V. Oppenheim, Alan S. Willsky, and S. Hamid Nawab, "*Signals and Systems*", 2nd Edition, PHI learning, 2010.
2. Tarun Kumar Rawat, "*Signals and Systems*", Oxford University *Press 2010.*
3. John Proakis and Dimitris Monolakis, "*Digital Signal Processing*", Pearson Publication, 4th Edition.

Internal Assessment (IA):

Two tests must be conducted which should cover at least 80% of syllabus. The average marks of both the tests will be considered as final IA marks

End Semester Examination:

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total 4 questions need to be solved.
3: Question No.1 will be compulsory and based on entire syllabus wherein sub questions of 2 to 5 marks will be asked.
4: Remaining questions will be selected from all the modules.

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Term Work:

At least 10 assignments based on the entire syllabus of Subject **EXC504 (Signals and Systems)** should be set to have well predefined inference and conclusion. The assignments should be students' centric and attempt should be made to make assignments more meaningful, interesting and innovative. Term work assessment must be based on the **overall performance** of the student with **every assignment graded from time to time**. The grades should be converted into marks as per the **Credit and Grading System** manual and should be **added and averaged**. The grading and term work assessment should be done based on this scheme.

The final certification and acceptance of term work ensures satisfactory performance of tutorial work and minimum passing marks in term work.