

Branch Name:	Information and Communication Technology
Semester/Year:	Semester III / Second Year
Subject Title:	Signals and Systems
Subject Code:	1ET1070302
Pre-requisite:	Basic Mathematics

Course Objectives:

- To train students for an intermediate level of fluency with signals and systems in both continuous time and discrete time, in preparation for more advanced subjects in digital signal processing, image processing, communication theory
- To study continuous and discrete-time signals and systems, their properties and representations and methods those are necessary for the analysis of continuous and discrete time signals and systems
- To study frequency-domain representation and analysis concepts using Fourier analysis tools, Laplace Transform and Z-transform

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	00	02	04	70	30	30	20	150

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Elementary signals, classification and representation of continuous time and discrete time signals, signal operations, continuous time and discrete time systems – classification, properties, differential equation representation of continuous time systems, difference equation representation of discrete time systems	8	20
2	Continuous time LTI systems and convolution integral, discrete time LTI systems and linear convolution, stability and causality of LTI systems, correlation between signals	8	20
3	Frequency domain representation of continuous time signals-continuous time Fourier series and its properties, convergence, continuous time Fourier transform and its properties, Laplace transform, ROC, Inverse transform, properties, relation between Fourier and Laplace transforms, Analysis of LTI systems using Laplace and Fourier transforms. Concept of transfer function, Frequency response, Magnitude and phase response.	12	30

4	Z transform, ROC , inverse transform, properties, frequency domain representation of discrete time signals, discrete time Fourier series and its properties, discrete time Fourier transform (DTFT) and its properties, relation between DTFT and Z-Transform, Analysis of discrete time LTI systems using Z transforms and DTFT, Transfer function	12	30
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Course Outcome:

The student will be able to:

1. Define, represent, classify and characterize basic properties of continuous and discrete times signals and systems
2. Outline the relation between convolutions, correlation
3. Represent the CT signals in Fourier series and interpret the properties of Fourier transform and Laplace transform
4. Determine z transforms, inverse z transforms and analyze LTI systems using z transform

Text Book:

1. Alan V. Oppenheim and Alan Willsky, Signals and Systems, PHI, 2/e, 2009
2. Simon Haykin, Signals & Systems, John Wiley, 2/e, 2003

List of Suggested Practical:

1. Basic Signal generation
2. Basic operations on signals
3. Convolution operation
4. Correlation operation
5. Moving average system
6. Impulse Response
7. Step response
8. Frequency domain
9. Z transform
10. Pole-zero and transfer function