SIGNALS AND SYSTEMS

Course Code	19EC3303	Year	II	Semester	I
Course Category	Program Core	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes
Upon successful completion of the course, the student will be able to

CO1	**Recognize** different characteristics of signals and systems
CO2	**Determine** the response of LTI system to any arbitrary input signal using convolution
CO3	**Resolve** continuous-time signals in frequency domain using Fourier series and Fourier transform
CO4	**Analyse** discrete-time signals and systems using DTFT
CO5	**Apply** the concepts of Laplace transform/Z-transform to analyze continuous-time/discrete-time signals in complex plane

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Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2: Medium, 1:Low)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2							2	2	1
CO2	3	3	3	2	2							2	2	1
CO3	3	3	2	2	2							2	2	1
CO4	3	3	3	2	2							2	2	1
CO5	3	3	2	2	2							2	2	1

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Signals and Systems:** Continuous-time and Discrete-time signals, Transformations of the independent variable, Exponential and Sinusoidal signals, The unit impulse and unit step functions, Continuous-time and Discrete-time systems, and Basic System properties.	CO1
II	**Linear Time Invariant Systems (LTI systems):** Discrete-time LTI systems, The convolution sum, Continuous time LTI systems, The convolution Integral, Properties of Linear Time-Invariant Systems.	CO2
III	**Fourier analysis of Continuous Time Signals and Systems:** Fourier series representation of continuous time periodic signals, convergence of the Fourier series, Properties of continuous-time Fourier series. The Continuous-Time Fourier Transform: The Fourier transform for periodic signals. Properties of the Continuous-time Fourier transform, Systems characterized by	CO3

	linear constant-coefficient differential equations.	
IV	**Fourier analysis of Discrete Time Signals and Systems:** The Discrete-Time Fourier Transform, Properties of the Discrete-time Fourier transform, The Fourier transform for periodic signals. Systems characterized by linear constant-coefficient difference equations.	CO4
V	**Analysis of Continuous time and Discrete time signals using Laplace Transform and Z Transform:** The Laplace Transform: The Region of convergence for Laplace transforms, the Inverse Laplace transform, Properties of the Laplace transform. The Z-Transform: The Region of Convergence for the Z-transform, The Inverse Z-transform, Properties of the Z-transform.	CO5

Learning Resources
Text Books
1. Alan V. Oppenheim, Alan S. Wilsky with S.HamidNawab, 'Signals and Systems', 2/e, Pearson Education, 1997.
Reference Books
1Bhagawandas P. Lathi, 'Linear Signals and Systems', Oxford University Press, 2009.
2.Simon Haykin, Barry Van Veen, 'Signals and Systems', 2/e, Wiley Student Edition.
3.Signals and Systems using MATLAB, Kindle Edition, Luis Chaparro
e- Resources & other digital material
1. http://www.cdeep.iitb.ac.in/nptel/Electrical%20&%20Comm%20Engg/Signals%20and %20System/TOC-M1.htm
2. http://www.cdeep.iitb.ac.in/nptel/Electrical%20&%20Comm%20Engg/Signals%20and %20System/Course%20Objective.htm
3. http://www.stanford.edu/~boyd.ee102
4. http://www.ece.gatech.edu/users/bonnie/book
5. http://ocw.mit.edu