

SIGNALS AND SYSTEMS

Course Code	19EE3303	Year	II	Semester	I
Course Category	Program Core	Branch	EEE	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.

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)														
Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation														
* - Average value indicates course correlation strength with mapped PO														
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, 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	CO3

	Continuous-time Fourier transform, Systems characterized by 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	
<ol style="list-style-type: none"> 1. Bhagawandas 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	
<ol style="list-style-type: none"> 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 	