Signals and Systems

Course Code	23ES1303	Year	II	Semester	I
Course Category	Engineering Science	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Pre requisites	Mathematics
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		BL
CO1	**Identify** different characteristics of signals and systems.	L2
CO2	**Determine** the response of LTI system to any arbitrary input signal using convolution.	L3
CO3	**Resolve** continuous-time signals in frequency domain using Fourier series and Fourier transform.	L3
CO4	**Analyse** continuous-time/Discrete-time signals using Laplace transform / Z-transform.	L4

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	PSO1	PSO2
CO1	2							2	2				
CO2	3							2	2			2	
CO3	3							2	2			2	
CO4		3						3	3			2	
Avg.	3	3						3	3			2	

Syllabus

Unit No.	Contents	Mapped CO
1	**Introduction:** Continuous-time and Discrete-time signals, Transformations of the independent variable, The unit impulse and unit step functions, Continuous-time and Discrete-time systems, Basic System properties.	CO1
2	**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.	CO1, CO2
3	**Fourier analysis of Continuous Time Signals:** Fourier series representation of continuous time periodic signals, convergence of the Fourier series, Properties of continuous-time Fourier series. The Continuous-Time Fourier Transform: Properties of the Continuous-time Fourier transform.	CO1, CO3
4	**Analysis of Continuous time signals using Laplace Transform:** The Laplace Transform: The Region of convergence for Laplace transform, Properties of ROC for Laplace transform, Properties of the Laplace transform, Inverse Laplace transform.	CO1, CO4

5	**Analysis of Discrete time signals using Z Transform:** The Z-Transform: The Region of Convergence for the Z-transform, Properties of ROC for Z-transform, Properties of the Z-transform, The Inverse Z-transform.	CO1, CO4

Learning Resources
Text Books
1. Alan V. Oppenheim, Alan S. Wilsky with S.Hamid Nawab, 'Signals and Systems', 2nd Ed, Pearson Education, 1997.
Reference Books
1. Simon Haykin, Barry Van Veen, 'Signals and Systems', 2nd Ed, John Wiley. 2. Bhagawandas P. Lathi, 'Linear Signals and Systems', Oxford University Press, 2009.
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