

EC25C04	Signals and Systems	L	T	P	C
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Course Objective: The course builds foundational skills for analyzing continuous and discrete-time signals, including their classification and properties, and explores key transforms (Fourier, Laplace, Z, DTFT).					
Introduction to Signals and Systems: Definition of Signals and Systems, Classification of Signals, Operations on signals, Singularity functions and related functions. Analogy between vectors and signals, orthogonal signal space, complete set of orthogonal functions, Parseval's relations.					
Fourier Series Analysis: Fourier series representation of continuous time periodic signals, Trigonometric and Exponential Fourier series, Properties of Fourier series.					
Fourier Transform & Laplace Transform: Fourier transform of aperiodic signals, standard signals and periodic signals, Properties of Fourier transforms. Hilbert transform and its properties. Laplace transforms, RoC, properties. Inverse Laplace transform.					
Continuous-Time LTI Systems: Continuous time Systems and its properties. Linear time invariant (LTI) system, Impulse response. Convolution. Analysis of LTI System using Laplace and Fourier transforms.					
Sampling, Quantization & Discrete-Time Systems: Sampling and reconstruction of band limited signals. Low pass and band pass sampling theorems. Aliasing. Anti-aliasing filter. Practical Sampling-aperture effect. Quantization. Discrete-time signals and systems. Discrete Fourier series, DTFT, Z-transform and its properties. Analysis of LTI systems using Z – transform.					
Suggested activities: Quiz based on competitive examination problems (GATE, IES), Simulation Assignment.					
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.					
Assessment Methodology: Assignment (20%), Software activity (20%), Quiz (20%), Internal Examinations (40%).					
References: 1.Oppenheim, A. V., & Schafer, R. W. (2010). Discrete-time signal processing (3rd ed.). Pearson. 2.Haykin, S., & Van Veen, B. (2012). Signals and systems (2nd ed.). John Wiley & Sons. 3.Mitra, S. K. (2009). Digital signal processing: A computer-based approach (3rd ed.). Tata McGraw Hill. 4.Vaidyanathan, P.P.(2024). Signals, Systems ,and Signal Processing India, Cambridge University Press.					
E-Resources: 1. NPTEL :: Electrical Engineering - Signals and Systems 2. https://onlinecourses.nptel.ac.in/noc21_ee28/preview 3. Principles of Signals and Systems - Course					