

## UEIXXX: TECHNIQUES ON SIGNALS AND SYSTEMS

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

**Course Objectives:** To introduce the basic concepts and processing of analog and digital signals.

**Introduction:** Signals and Systems, Classification of signals, Continuous time signals and its classifications, Standard continuous time signals, Classification of continuous time systems, Discrete time signals and its classifications, Concept of frequency in discrete time signals, Standard discrete time signals, Discrete time systems, Classification of discrete time systems, Nyquist rate, Sampling theorem, Aliasing, Convolution, Correlation.

**Fourier Transform:** Introduction, Condition for existence of Fourier Integral, Fourier Transform and its properties, Energy density and Power Spectral Density, Nyquist Theorem, System Analysis using Fourier Transform.

**Z-Transform:** Introduction, Region of Convergence(ROC), Properties of z-transform. Initial value theorem, Final Value theorem, Partial Sum, Parseval's Theorem, z-transform of standard sequences, Inverse z-transform, Pole-Zero plot, System function of LTI system, Causality and Stability in terms of z-transform.

**Random Signals:** Introduction, Probability, Random variables, Gaussian distribution, Transformation of random variables, random processes, stationary processes, Correlation and Covariance Functions.

### Course Learning Outcomes (CLO):

After the successful completion of the course the students will be able to:

1. Apply sampling theorem for different applications
2. Solve problems related to Fourier transforms
3. Apply Fourier transforms for different applications
4. Apply z-transform and Laplace transform for system characterization
5. Elucidate the concepts of random signals

### Text Books:

1. Oppenheim, A.V. and Willsky, A.S., *Signals and Systems*, Prentice Hall of India (1997).
2. Proakis, J.G. and Manolakis, D.G., *Digital Signal Processing: Principles, Algorithms and Applications*, Prentice Hall (2007).

### Reference Books:

1. Lathi, B.P., *Signal Processing and Linear System*, Oxford University Press (2008).
2. Roberts, M.J., *Fundamentals of Signals and Systems*, McGraw Hill (2007).

### Evaluation Scheme:

S.NO.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessional (May include Assignments//Quizzes/Lab Evaluations)	25