**Basic Signals and Systems**

**Detailed Syllabus**

**UNIT I: Pre- Requisites:** *Differential Equations.*

**Introduction to Continuous Time Signals and Systems:** Introduction to continuous time and discrete time signals, Classification of signals with their mathematical representation and characteristics. Transformation of independent variable, Introduction to various type of system, basic system properties.

**Analogous System:** Linear & Rotational mechanical elements, force-voltage and force-current analogy, modeling of mechanical and electro-mechanical systems: Analysis of first and second order linear systems by classical method.

**UNIT II: Pre- Requisites:** *Fourier Series & Fourier Transform*

**Fourier Transform Analysis:** Exponential form and Compact trigonometric form of Fourier series, Fourier symmetry, Fourier transform: Properties, application to network analysis. Definition of DTFS, and DTFT, Sampling Theorem.

**UNIT III: Pre- Requisites:** *Laplace Transform*

**Laplace Transform Analysis:** Review of Laplace Transform, Properties of Laplace Transform, Initial & Final value Theorems, Inverse Laplace Transform, Convolution Theorem, Impulse response, Application of Laplace Transform to analysis of networks, waveform synthesis and Laplace Transform to complex waveforms

**UNIT IV: Pre- Requisites:** *Matrix Calculations.*

**State – Variable analysis**: Introduction, State Space representation of linear systems,  
Transfer function and state Variables, State Transition Matrix, Solution of state equations for homogeneous and non-homogeneous systems, Applications of State Variable technique to the analysis of linear systems.

**UNIT V: Pre- Requisites:** *Z-Transforms*

**Z-Transform Analysis:** Concept of Z – Transform& ROC, Z – Transform of common functions,

Inverse Z – Transform, Initial & Final value Theorems, Applications to solution of difference equations, Properties of Z-transform.

**Text Books:**

1. Oppenhiem, Wilsky, Nawab, “Signals & Systems”, PHI.
2. Anand Kumar, “Signals & Systems”, PHI.
3. Choudhary D. Roy, “Network & Systems”, Wiley Eastern Ltd.

**Reference Books:**

1. David K. Cheng; “Analysis of Linear System”, Narosa Publishing Co.
2. Donald E. Scott, “Introduction to circuit Analysis” Mc. Graw Hill.
3. BP Lathi, “Linear Systems & Signals” Oxford University Press, 2008.
4. IJ Nagrath, S.N. Saran, R. Ranjan and S. Kumar, “Signals and Systems”, TataMc.Graw Hill, 2001.
5. ME Van-Valkenberg; “ Network Analysis”, Prentice Hall of India

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