

## **ELI- 504: Signals and Systems**

**48 Periods**

### **UNIT 1**

Signals and Systems: Continuous and discrete time signals, Transformation of the independent variable, Exponential and sinusoidal signals, Impulse and unit step functions, Continuous-Time and Discrete-Time Systems, Basic System Properties. 15 Periods

### **UNIT 2**

Linear Time-Invariant Systems (LTI): Discrete time LTI systems, the Convolution Sum, Continuous time LTI systems, the Convolution integral. Properties of LTI systems, Commutative, Distributive, Associative. 11 Periods

### **UNIT 3**

LTI systems with and without memory, Invariability, Causality, Stability, Unit Step response. Differential and Difference equation formulation, Block diagram representation of first order systems. 11 Periods

### **UNIT 4**

Laplace Transform: Laplace Transform, Inverse Laplace Transform, Properties of the Laplace Transform, Laplace Transform Pairs, Laplace Transform Methods in Circuit Analysis, Impulse and Step response of RL, RC and RLC circuits. 11 Periods

#### **UNIT 1**

Chapter 1 A. V. Oppenheim, A. S. Wilsky and S. H. Nawab, Signals and Systems, Pearson Education (2007)

Chapter 1 S. Haykin and B. V. Veen, Signal and Systems, John Wiley & Sons (2004)

#### **UNIT 2**

Chapter 2 A. V. Oppenheim, A. S. Wilsky and S. H. Nawab, Signals and Systems, Pearson Education (2007)

Chapter 2 S. Haykin and B. V. Veen, Signal and Systems, John Wiley & Sons (2004)

#### **UNIT 3**

Chapter 2 A. V. Oppenheim, A. S. Wilsky and S. H. Nawab, Signals and Systems, Pearson Education (2007)

Chapter 2 S. Haykin and B. V. Veen, Signal and Systems, John Wiley & Sons (2004)

#### **UNIT 4**

Chapter 9 A. V. Oppenheim, A. S. Wilsky and S. H. Nawab, Signals and Systems, Pearson Education (2007)

Chapter 6 S. Haykin and B. V. Veen, Signal and Systems, John Wiley & Sons (2004)

Chapter 15 & 16 C. Alexander and M. Sadiku, Fundamentals of Electric Circuits , McGraw Hill (2008)

#### **Suggested Books:**

1. H. P. Hsu, Signals and Systems, Tata McGraw Hill (2007)

2. S. T. Karris, Signal and Systems: with MATLAB Computing and Simulink Modelling, Publications (2008)
3. W. Y. Young, Signals and Systems with MATLAB, Springer (2009)
4. M. Roberts, Fundamentals of Signals and Systems, Tata McGraw Hill (2007)

**Practicals:**

1. Learning SciLAB/MATLAB (Experiments based on available system)
2. Explorations of Signals and Systems using SciLAB/MATLAB
  - a. Generation of Signals: continuous time
  - b. Generation of Signals: discrete time
  - c. Convolution of Signals
  - d. Solution of Difference equations.
  - e. Introduction to SIMULINK and calculation of output of systems represented by block diagrams