AIT 124 **BASIC ELECTRONICS** **3 (2+1)**

Objective(s)
After learning the course the students should be able to: Understand circuit analysis concepts, analog and digital building basics, communication channels and control systems.

Unit I
Circuit Concepts
Electrical Quantities, Lumped Circuit Elements, Kirchhoff's Laws, Meters and Measurements, Analogy between Electrical and other Non-Electrical Physical Systems, A case study

Unit II
Circuit Analysis Techniques
Thevenin and Norton Equivalent Circuits, Node-Voltage and Mesh-Current Analysis, Superposition and Linearity, Computer Aided Circuit Analysis, A Case Study

Unit III
Analog Building Blocks and Operational Amplifiers Basic ideas
The Amplifier Block, Ideal Operational Amplifier, Practical Properties of Operational Amplifiers, Applications of Operational Amplifiers

Unit IV
Digital Building Blocks
Digital System Building Blocks, Digital System Components, Computer Systems
Signal Processing
Signals and Spectral Analysis, Modulation, Sampling and Multiplexing, Interference and Noise

Unit V
Communication Systems
Waves, Transmission Lines, waveguides and Antenna Fundamentals, Analog Communication Systems, Digital Communication Systems
Basic Control Systems
Feedback Control Systems, Digital Control Systems

Reference Book(s):
1. S. Chand, D.P. Kothari and I.J. Nagrath, Theory and Problems in Basic Electrical Engineering, Prentice Hall, India
2. V.N. Mittal and A. Mittal, Basic Electrical Engineering, Tata McGraw Hill
3. Vincent Del. Toro, Principles of Electrical Engineering, Prentice Hall, India
4. Surjit Singh, Electrical Estimating & costing, Dhanpat Rai & Co.

5. Electronics Device and circuits by S Salivahanan and N Suresh Kumar, Tata McGraw Hill Publication
6. Electronics Device and circuits by Jacob Milman and Christos C. Halkias, Tata Macgraw Hill Publication
7. Basic Electronics devices and Circuits by Mahesh B Patil, PHI Learning PVT. Ltd.
8. Introduction to Electrical Engineering, M S Sarma, Oxford University Press

Practical(s)
1. Observe the behavior of RLC circuits with ideal and non-ideal voltage sources and current sources
2. Verify Thevenin's and Norton's Theorems
3. Study of passive electrical circuits
4. Determine the parameters of Op Amps
5. Perform simple analog signal processing functions using Op Amps
6. Design simple combinational functions as per specifications
7. Design simple sequential functions as per specifications
8. Measure the characteristics of given DACs and ADCs
9. Measure the performance of a given signal processing system
10. Determine the behavior of a given analog communication system
11. Determine the behavior of a given digital communication system
12. Determine the behavior of a second and third order control systems
13. Determine the behavior of a practical control system using ON-OFF and P controllers
14. Determine the behavior of a practical control system using PI and PID controllers