|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **B. TECH 1st SEMESTER** | **L** | **T** | **P** | **C** |
| **3** | **-** | **-** | **3** |
| **16EE1T01: Basic Electrical and Electronics**  |

**COURSE OBJECTIVES**

The student able to Understand:

1. To study the concepts of various electrical elements, various network reduction techniques and AC circuits.
2. To understand the principle of operation and performance of DC and AC machines.
3. To study the principle of operation and working of various types of measuring instruments.
4. To study the construction details, operation and characteristics of various semiconductor devices, digital and logic operations.

**COURSE OUTCOMES**

Students are able to

1. Solve electrical networks with network topology concepts.
2. Analyze the characteristics and performance of DC and AC machines.
3. Choose right type of instrument for measurement of various electrical parameters.
4. Explain the operation and characteristics of various semiconductor devices and concepts of digital and logic operations.

**UNIT – I**

**Introduction To Electrical Engineering:** Basic Electrical circuit elements (Resistor, Inductor and capacitor)-voltage and current sources-Ohm’s Law-Kirchhoff’s Laws-series circuits-equivalent resistance-star/delta conversion- Node and mesh analysis of DC circuits - Simple problems.

**Network Theorems (DC Excitation)**-Superposition-Thevenin’s-Norton’s-Maximum Power Transfer Theorem-Simple problems

**UNIT – II**

**Ac Fundamentals:** Introduction to AC circuits-RMS value-average value-form and peak factors – Real and reactive power – Apparent power- power factor- Behavior of R, L, and C in AC Circuits-Introduction to three phase circuits- phase and line parameters-three phase balanced and unbalanced systems-Simple problems.

**UNIT – III**

**Electrical Machines:** DC Machines: Classification of DC Machines-DC Generator and Motor-Construction-Principle of operation –EMF Equation-Performance Characteristics-Simple problems

AC Machines: Classification of AC Machines-Transformers-Synchronous Machines, Induction motor-Performance Characteristics-Starting Methods-Simple problems**.**

**UNIT – IV**

**Measurement and Measuring Instruments:** Introduction – Analog and Digital Instruments – Passive and Active Instruments – Static

Characteristics – Linear and Non-linear Systems – Dynamic Characteristics – Classification of the Instrument System – Measurement of Error – Indicating type Instruments – Measurement of Power-Voltmeter and Ammeter method- two and three wattmeter method-Measurement of Energy.

**UNIT-V**

**Semi Conductor Devices And Its Characteristics :** Characteristics of PN Junction Diode –– Zener Diode- Intrinsic and Extrinsic Semiconductors – Semiconductor Diodes– Bipolar Junction Transistors-CB, CE, CC Configurations and Characteristics – FET – MOSFET – Silicon-controlled Rectifier – DIAC – TRIAC-Half waveand Full wave Rectifiers- Voltage Regulation.

**UNIT – VI**

**Introduction To Digital Electronics :** Binary Number System – Logic Gates – Boolean Algebra -De Morgan’s Theorem- Simplification of Boolean Expressions using De Morgan’s Theorem – Half and Full Adders – A/D and D/A Conversion.

**Text Books:**

1. Electrical and Electronic Principles and Technology-John Bird, Published by Elsevier Ltd
2. Engineering Circuit Analysis – William H. Hayt& Jack E. Kemmerly, Tata McGraw-Hill Company,7thEdition.

. **Reference Books:**

1. Basic Electrical and Electronics Engineering – S. K. Bhattacharya, Pearson Publications.
2. Basic Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria & Sons Publications.
3. A Course in Electrical and Electronic Measurements and Instrumentation – A. K. Sawhney, DhanpatRai & Co.
4. Electronic Devices and Circuit Theory – Robert L. Boylestad& Louis Nashelsky, Prentice- Hall of India, 6th Edition.
5. Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria& Sons Publications.