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| **BASIC ELECTRICAL & ELECTRONICS** |

(Common for CSE, ME and CIVIL)

**UNIT – I: BASIC CONCEPTS, LAWS AND PRINCIPLES**

Introduction – Atomic Structure and Electric Charge – Conductors, Insulators, and Semiconductors – Electric Field and Magnetic Field – Electric Current, Resistance, Potential, and Potential Difference – Ohm’s Law – Work, Power and Energy – Electromagnetism and Electromagnetic Induction – Induced EMF – Inductance of a Coil – Electrical Circuit Elements (Resistor, Inductor, and Capacitor) – Voltage & Current Sources.

**UNIT – II: AC FUNDAMENTALS**

Generation of Alternating Voltage – Concept of Average Value and Root Mean Square Value of an Alternating Quantity – Behavior of R, L, and C in AC Circuits – Power in AC Circuits – AC Series & Parallel Circuits.

**Three-Phase Circuits:** Generation of Three Phase Voltages – Three-Phase Winding Connections (Y and Δ Connections) – Measurement of Three-phase Power.

**UNIT – III: 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 Error – Indicating type Instruments – Measurement of Power, Measurement of Energy – Instrument Transformers – Megger& Measurement of Insulation Resistance – Multi-meter and Measurement of Resistance

**UNIT – IV: SEMI CONDUCTOR DEVICES**

Introduction –Binding Forces between Atoms in Semiconductor Materials – Extrinsic Semiconductors – Semiconductor Diodes – Zener Diode – Bipolar Junction Transistors – Field Effect Transistors – MOSFET – Silicon-controlled Rectifier – DIAC – TRIAC.

**UNIT – V: DIGITAL ELECTRONICS**

Introduction – Number Systems – Octal Number Systems – Hexadecimal Number System – Logic Gates – Boolean Algebra – De Morgan’s Theorem – Combinational Circuits – Simplification of Boolean Expressions using De Morgan’s Theorem – Universal Gates.

**UNIT – VI: BASICS OF COMMUNICATION**

Introduction – Elements of Communication Systems – Basic Electronic Communication – Bandwidth and its Significance – Types of Modulation – Comparison of Amplitude Modulation and Frequency Modulation – Demodulation -Basics of Microwave and Satellite Communication – Television Systems – Mobile Communication.

**Text Book (s):**

1. Basic Electrical and Electronics Engineering – S. K. Bhattacharya, Pearson Publications.
2. Basic Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria & Sons Publications.

**References:**

1. Engineering Circuit Analysis – William H. Hayt& Jack E. Kemmerly, Tata McGraw-Hill Company, 7th Edition.
2. A Course in Electrical and Electronic Measurements and Instrumentation – A. K. Sawhney, DhanpatRai& Co.
3. Electronic Devices and Circuit Theory – Robert L. Boylestad& Louis Nashelsky, Prentice-Hall of India, 6th Edition.
4. Electrical & Electronics Engineering – J. B. Gupta, S. K. Kataria& Sons Publications.
5. Engineering Basics: Electrical, Electronics and Computer Engineering – Thyagarajan T., New Age International, 3rd edition (2007).