

Course Code	Course Name	Hours per Week			Total	Total
		L	T	P	Hrs.	Credits
EN3ES04	Basic Electrical & Electronics Engineering	3	1	2	6	5

Unit-I Fundamental of Circuit Theory:

Introduction to DC and AC circuits, Active and passive two terminal elements, Voltage-Current relations for resistor, inductor, capacitor, Kirchhoff's laws, Mesh analysis, Nodal analysis, Ideal and practical sources, equivalent resistor, current division, voltage division. Introduction to magnetic circuits- Simple magnetic circuits, Faraday's laws, induced emfs and inductances.

Unit-II Circuit Analysis

Circuit Theorems: Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer and Millman's Theorem. Star-Delta Transformation. RL, RC and RLC circuits (series and parallel), Phasor representation, Q-factor, Bandwidth.

Unit-III Transformers and Rotating Machines

Ideal Transformer, Single Phase Transformers: Principle of Operation of a Single Phase Transformer, EMF equation, Phasor diagram, Equivalent Circuit, Determination of Equivalent Circuit Parameters, Regulation and Efficiency of a single phase transformer. Operating principle of autotransformer. Introduction to rotating machines e.g. Dc motor, Induction motor, synchronous machines and their characteristics (with derivation).

Unit-IV Diodes and Transistors

Band theory of solids, qualitative discussion of Kronig-Penny Model, effective mass, Fermi-Dirac function, statistical distribution, Semiconductor Diode, Zener Diode, Rectifier Circuits, Wave Shaping Circuits, Bipolar Junction Transistors, JFET, MOSFET.

Unit-V Digital System

Number Systems and Codes, Logic Gates, Boolean Theorems, De-Morgan's Theorems, NAND and NOR gate Latches, S-R Flip-Flop, J-K Flip-Flop, Binary Addition, 1's and 2's Complement System, Full Adder.

Text Books

1. D.P. Kothari and I.J.Nagrath, Basic Electrical Engineering, Second edition, Tata McGraw - Hill.
2. S.K. Bhattacharya, Basic Electrical and Electronics Engineering, First edition, Pearson Education.
3. V.C.Deltoro, Electrical Engineering Fundamentals, Second Edition, PHI.
4. V.N. Mittal & Mittle, Basic Electrical Engineering, Tata McGraw - Hill
5. E. Fitzgerald, D.E. Hingumbotham and A. Grabel, Basic Electrical Engineering, McGraw-Hill.
6. J. Millman & C.C. Halkias, Integrated Electronics, Tata McGraw-Hill Education.
7. R. Boylestad, L. Nashelsky, Electronic Devices And Circuit Theory, Seventh Edition, PHI.

List of Practicals

1. To verify KCL and KVL.
2. To verify Thevenin's theorem.
3. To verify Superposition theorem.
4. To verify Norton's theorem.
5. To perform short circuit test on a single phase transformer.
6. To perform open circuit test on a single phase transformer.
7. To verify V-I characteristic of Semiconductor diode.
8. To verify V-I characteristic of Zener diode.
9. To verify Input and Output waveform of Half wave Rectifier.
10. To verify Input and Output waveform of Bridge Rectifier.
11. To verify Input and Output characteristic of BJT in CB and CE configurations.
12. Implementation of basic logic gates using Universal gates (NAND, NOR).
13. Verify Truth Table of R-S and J-K Flip-flop using NAND gate.