

## CC131: BASIC ELECTRICAL TECHNOLOGY

CREDITS -5 (L=3, T=0, P=2)

### Course objective:

The subject aims to provide the student of various disciplines with:

- C1. An understanding of basic abstractions of major fields of electrical engineering on which analysis and design of electrical systems are based
- C2. The capability to use abstractions to comprehend and analyze electrical devices, equipments & systems in terms of performance and discrepancies.
- C3. Knowledge for learning advanced topics in electrical engineering
- C4. The capability to incorporate the knowledge of electrical engineering in their Respective field while designing and executive their own systems.

### Teaching & Assessment Scheme:

Teaching Scheme			Credit	Examination Marks				Total Marks
L	T	P		Theory		Practical		
			ESE	CE	ESE	CE		
3	0	2	5	70	30	30	20	150

### Course contents:

Unit No.	Topics	Teaching Hours
1	<b><u>Steady-state DC circuit analysis:</u></b> Types of electrical sources. Series & parallel resistances, Solution of electrical circuits using KVL & KCL, star-delta conversion, nodal, mesh and loop analysis.	05
2	<b><u>Capacitance:</u></b> Dielectric strength; Capacitor; Charging & discharging of capacitor; Capacitor in series and parallel; Energy stored in a capacitor.	04
3	<b><u>Electromagnetism:</u></b> Faradays Laws; Lenz's Law; Fleming's Rules; Effect of magnetic field on current carrying conductor; Magnetic circuits; Rise & decay of current in an inductive circuit; Statically and dynamically induced EMF; Concepts of self-inductance, mutual inductance and coefficient of coupling; Inductance in series and parallel; Hysteresis and eddy current losses; Energy stored in magnetic fields. Comparison of R, L & C.	05

4	<b><u>Single Phase A. C. Circuits:</u></b> Generation of a. c. voltage; Vector & phasor representation of a. c. quantities; Analysis of R, L, C, R-L, R-C and R-L-C circuits with.  <b><u>Phasor diagrams:</u></b> Concepts of real, reactive & apparent power and power factor; Series, parallel and series - parallel a.c. circuits; Resonance in series and parallel circuits, Concept of power factor improvement.	08
5	<b><u>Three Phase A. C. Circuits:</u></b> Advantages of three phase systems; Generation of three phase power; Phase sequence; Balanced supply and load; Relationship between line and phase values of balanced three phase circuit; Power Measurement in single phase & balanced three phase circuits.	04
6	<b><u>Electrical Machines</u></b> Principle of operation of transformer, a.c.& d.c. motors and generators; Classification of transformers & electrical machines; Their constructional features and Applications; Concept of losses & efficiency	08
7	<b><u>Electrical Measurement</u></b> Classification of measuring instruments; Elementary treatment of PMMC, Moving iron and Digital meters.	04
8	<b><u>Allied topics:</u></b> Single line diagram of electrical power system; Classification of wiring; Simple control circuit in domestic installation; Concept of fuse, MCB, ELCB and earthing.	04
<b>TOTAL</b>		<b>42</b>

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**List of References:**

1. B. L. Theraja, Electrical Technology, Vol – 1 & 2, S. Chand.
2. D. P. Kothari and I. J. Nagrath, Theory and Problems in Basic Electrical Engineering, Prentice Hall, India.
3. V. K. Mehta, Rohit Mehta, Principles of Electrical Engineering, S. Chand.
4. Vincent Del. Toro , Principles of Electrical Engineering, Prentice Hall, India
5. Martin U. Reissland, Electrical Measurements: Fundamentals, Concepts, Applications, New Age International Publication

**Course Outcomes (COs):**

After learning this course the students will be able to:

- CO1.** Assess the knowledge about the electric and magnetic circuits.
- CO2.** Practice the fundamentals of AC supply systems and their applications.
- CO3.** Interpret the working and applications of various electrical machines.
- CO4.** Associate the knowledge about various measuring instruments and wiring system.
- CO5.** Comprehend the advance subjects of electrical engineering.