



Syllabus for the Academic Year – 2020 - 2021

Department: Electrical & Electronics Engineering

Semester: I

Course Name: BASIC ELECTRICAL ENGINEERING

Course Code: ES-EEI102

L-T-P-C:3-0-2-4

Course Objectives:

1. To understand the fundamentals of Electrical Engineering
2. To analyze electrical circuits & operating principle of Electrical machines
3. To understand the role & importance of electrical wiring, protective devices & earthing in electrical system.
4. To evaluate Electrical quantities with respect to performance of Electrical machines

UNIT	Description	Hours
I	<b>A.C Fundamentals:</b> Generation of sinusoidal voltage, definition of instantaneous value, maximum value, frequency, time period, cycle, average value, RMS value, form factor, peak factor of sinusoidally varying quantity, phase, phase difference and phasor representation of alternating quantities. <b>A.C Circuits:</b> Analysis with phasor diagram of circuits with R, L, C, R-L, R-C, R-L-C combination in series, parallel & series-parallel circuits, real power, reactive power, apparent power and power factor, illustrative examples.	8
II	<b>Three Phase Balanced Circuits:</b> Introduction to three-phase generation, Voltage and current relations in star and delta connected system, Measurement of three phase power by using two wattmeter method, Illustrative examples. <b>Domestic wiring:</b> Two way and three way control of lamp, elementary discussion on fuse, Miniature Circuit Breaker(MCB), Earth Leakage Circuit Breaker(ELCB), Electric shock, precautions against shock, earthing, plate and pipe earthing.	8
III	<b>Single Phase Transformers:</b> Faraday's Laws, Statically & dynamically induced EMFs, self and mutually induced emf, coefficient of coupling, Fleming's rules, construction, types, principle of operation, emf equation, losses, efficiency, Illustrative examples on emf equation and efficiency.	8
IV	<b>D.C Machines:</b> Construction, basic parts of D.C machines, types of D.C machines <b>D.C Generator-</b> Principle of operation, emf equation, Illustrative examples. <b>D.C Motor-</b> Principle of operation, back emf, torque equation, Illustrative examples.	8
V	<b>Three Phase Induction Motors:</b> Construction, working, types, concept of rotating magnetic field, slip, Illustrative examples on slip calculation. <b>Alternators:</b> Principle of operation, types, emf equation, concept of pitch factor and distribution factor (derivation excluded), Illustrative examples on emf equation.	7



### List of Experiments:

Expt. No.	Description	Hours
I	i) Demonstration on different types of measuring instruments. ii) Demonstration on different protective devices in electrical circuit.	2
II	Verification of truth table for two way and three way control of lamp.	2
III	Determine the relationship between line and phase quantities of voltage and current in a three phase system.	2
IV	Determination of Power factor for different lighting systems.	2
V	Determine the Efficiency of transformer at different loading conditions.	2

### Course Outcomes:

At the end of the course, the student will be able to:

1. Use the fundamental principle of Electrical Engineering for preliminary applications.
2. Can analyze electrical circuits (single Phase & Three Phase) involving different electric machines.
3. Can apply the knowledge of electrical wiring, protective devices & earthing for safety of the systems.
4. Evaluate Electrical quantities and performance of Electrical machines.

### Text Book:

Basic Electrical Engineering, Kulshreshtha D. C, Revised first edition 2017, TMH Publications, New Delhi.

### Reference Books:

1. Basic Electrical Engineering, M.V.Rao, Subhash Publications, Bangalore.
2. Electrical Technology, E. Hughes, International Students, 9<sup>th</sup> Edition, Pearson 2005.
3. Fundamentals of Electrical Engineering, B.L.Theraja, volume I, S Chand Publications, New Delhi.
4. Electrical Technology, B.L.Theraja, Volume II, S Chand Publications, New Delhi.