Course Type	Course Code	Name of the Course	L	Т	Р	Credits
ESO	EEE 201	Applied Electrical Engineering	3	0	0	9

Course Objective

The objective of this course is to provide knowledge in the field of electrical engineering for application point of view. It discusses two major portions of electrical engineering i.e. electrical machines and power system. Two most usable electrical machine in recent times i.e. transformer and three-phase induction motors are major focus of this course. However this course also focused on the fundamental concepts regarding power systems and operations.

Learning Outcomes

Upon successful completion of this course, students will:

- get adequate knowledge about the most used stationary electrical machine i.e. transformer.
- understand the operating principle of most used rotational electrical machine i.e. induction machine.
- also able to gain fundamental concept about power system and its operations.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Transformer: Single-phase transformer: EMF equation; Equivalent circuit; Phasor diagram; Open circuit and short circuit test; Efficiency; All-day efficiency; Regulation; Parallel operation; Auto-transformer; Industrial application. Three-phase Transformer: Construction; Parallel operation; Three-phase autotransformer; Industrial application.	12	Understand the essential operation and construction of single-phase and three-phase transformers.
2	Three-Phase Induction Motor: Principle of operation; Phasor diagram; Equivalent circuit; Torque-slip characteristics; Effect of change in rotor resistance in slip-ring machine; Determination of equivalent circuit parameters; Starting and speed control of three phase induction motor.	10	Understand the principle operations and construction of three-phase induction motor and also able to understand how speed control of induction motor has been done.
3	Introduction to SCR- based speed control and industrial application, Four quadrant operation.	05	Understand the operation of the power converter for the Speed control of motor drives.
4	Electrical Power System: Layout of electrical power system; Distribution system; Various types of substation; Introduction to solar and wind energy system; Circuit breakers (CBs): Principle of operation, Arc interruption methods, Restriking voltage and Recovery voltage, Resistance switching, Types of CBs: Oil CBs, Air-break CBs and SF6 CBs. Protective relays - Induction pattern over current relay, thermal overload relay, earth fault relay; Principles of tariff; Power factor improvement; Power cables - Types of cables, Capacitance of single core and 3-core cables, Dielectric stress, Optimum cable thickness,Grading.	15	Understand the basics of electrical power system and getting familiar with some power system equipment. Also, able to understand the basic principle of circuit breakers and relays for power system protection.

Text Books:

- 1. B.L. Theraja & a.k. Theraja "A Textbook Of Electrical Technology AC and DC Machines" S. Chand Publishing
- 2. Mehta V. K. "Principles of Power System" S. Chand & Co Ltd

Reference Books:

- 1. E. Fitzgerald, Stephen D. Umans, Charles Kingsley, "Electric Machinery", Tata Mc Graw-Hill.
- 2. C.L. Wadhwa, "Electrical Power System", New age international Ltd.