



I Year-II Semester		L	T	P	C
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BASIC ELECTRICAL ENGINEERING (ES1211)					

Prerequisite Course: Students require Basic knowledge of Electrical circuit components

Course Description and Objectives:

- To understand the principle of operation, constructional details and operational characteristics of DC generators.
- To understand the principle of operation, characteristics of DC motor. Methods of starting and speed control methods of DC motors
- To learn the constructional details, principle of operation and performance of transformers.
- To study the principle of operation, construction and details of synchronous machines
- To learn the principle of operation, constructional details, performance, torque – slip characteristics and starting methods of 3-phase induction motors

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

CO	Course Outcomes	POs
1	Understand the principle of operation, constructional details and operational characteristics of DC generators	3
2	Understand the principle of operation, characteristics of DC motor. Methods of starting and speed control methods of DC motors	2
3	Learn the constructional details, principle of operation and performance of transformers	3
4	Study the principle of operation, construction and details of synchronous machines	4
5	Learn the principle of operation, constructional details, performance, torque – slip characteristics and starting methods of 3-phase induction motors	3

Syllabus:

UNIT I:

Objective: To understand the principle of operation, constructional details and operational characteristics of DC generators & DC Machines



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Principle of operation of DC generator – emf equation – types of DC machines – torque equation of DC motor – applications – three point starter - losses and efficiency - swinburne's test - speed control methods – OCC of DC generator- Brake test on DC Shunt motor-numerical problems

UNIT II:

Objective: To understand the principle of operation, characteristics of DC motor. Methods of starting and speed control methods of DC motors Transformers

Principle of operation of single phase transformer constructional features – EMF equation – Losses and efficiency of transformer- regulation of transformer – OC & SC tests predetermination of efficiency and regulations – Sumpner's test-Numerical Problems.

UNIT III:

Objective: To learn the constructional details, principle of operation and performance of transformers.

Synchronous Generators Principle of operation and construction of alternators – types of alternators Regulation of alternator by synchronous impedance method-EMF equation of three phase alternator

Synchronous Motors Construction of three phase synchronous motor - operating principle –equivalent circuit of synchronous motor.

UNIT IV:

Objective: To study the principle of operation, construction and details of synchronous machines.

Induction Machine: Principle of operation and construction of three-phase induction motors –slip ring and squirrel cage motors – slip-torque characteristics – efficiency calculation – starting methods- Brake test on 3-Phase Induction Motor.

UNIT V:

Objective: To learn the principle of operation, constructional details, performance, torque – slip characteristics and starting methods of 3-phase induction motors

Special Machines: Principle of operation and construction - single phase induction motor - shaded pole motors – capacitor motors and AC servomotor.

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TEXT BOOKS:

1. Principles of Electrical Machines by V.K. Mehta & Rohit Mehta, S.Chand publications
2. Theory & performance of Electrical Machines by J.B.Guptha, S.K.Kataria & Sons

REFERENCE BOOKS:

- 1 .Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah,TMH Publications
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications,2nd edition
3. Basic Electrical Engineering by Nagsarkar,Sukhija, Oxford Publications,2nd edition