

13EE42E2-ELECTRICAL MACHINE DESIGN

(EEE)

Lectures/Week: 4Hrs.
End Exam Duration: 3Hrs

Credits: 4
Sessional Marks: 40
End Exam Marks: 60

UNIT-I

DESIGN PROBLEM: Basic considerations, design specifications, ISI specifications, design constraints, specification of transformers, rotating machines.

DESIGN OF TRANSFORMERS: Types of transformer – core construction, output equation, principle of design of core, windings, yoke main dimensions (H & W) for single phase: core type, shell type.

3-phase – core type transformers estimation of no load current of transformer.

UNIT-II

GENERAL CONCEPTS OF ROTATING MACHINES: Output equation of dc machines, ac machines, separation of D & L choice of specific loadings.

DESIGN OF DC MACHINES: Choice of no. of poles, selection of no. of armature slots, choice of winding, estimation of conductor cross section of armature, design of field systems: tentative design of field winding of dc machines.

UNIT – III

DESIGN OF 3-PHASE INDUCTION MOTOR: Separation of D&L, ranges of ac and Bar.

Stator design – Selection of no of stator slots, turns per phase, design of conductor cross section.

Rotor design - Selection of no of rotor slots, principles of design of squirrel cage rotor, design of slip ring rotor.

UNIT – IV

DESIGN OF SYNCHRONOUS MACHINES: Separation of D & L, choice of ac & Bar - short circuit ratio (SCR) and its significance.

ARMATURE DESIGN: choice of no. of stator (Armature) slots, turns/phase, conductor cross section for both salient pole and cylindrical pole machines.

UNIT – V

HEATING & COOLING: Theory of Solid body heating, heating time constant- cooling time constant, elementary treatment of cooling and heating time curves.

Volume of coolant required, types of coolants, cooling methods of transformer- hydrogen cooling, transformer tank design.

TEXT BOOKS:

1. "Electrical machine design" by A.K.Sawhney dhanpati rai publishers
2. "Design of Electrical Machines" by V. N. Mittle, Standard Publishers Distributors

REFERENCES:

1. "Principles of Electrical machine design" by M.G.Say & parkersmith.
2. "Electrical machine design" by Balbir Singh, Vikas Publishing House