

Design, Management and Auditing of Electrical System [DMAES]

B.E. Sem. VIII [ELEC]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical & Oral	–	–
Oral Exam	–	25
Term Work	–	25

SYLLABUS

1. Introduction

Types of electrical Projects, types of electrical systems, review of components of electrical system
Different plans/ drawings in electrical system design, single line diagram in detail, Introduction to
Energy Conservation Act 2001, Basics of tendering and estimation, Review of Economic and
financial analysis techniques: time value of money, Simple payback, IRR.

2. Design of Power Distribution System

Different types of distribution systems and selection criteria, Temporary and permanent power
supply, Electrical load: size, LF, DF, future estimates, Substation equipments options, Design
considerations in: Transformer selection, sizing and specifications. IS standards applicable in above
designs.

3. Design of Switchgear Protection and Auxiliary system

Selection of HT/LT switchgears, Metering, Switchboards and MCC, Protection systems, co-
ordination and discrimination; Cables: selection and sizing, cable installation and management
systems, bus-bars; Basics of Selection of emergency/backup supplies, UPS, DG set, Batteries;
Preliminary design of interior lighting system. IS standards applicable in above designs.

4. Monitoring and Management of Electrical Systems

Energy Monitoring and Targeting: Defining monitoring & targeting, Elements of monitoring &
targeting, Energy analysis techniques for energy optimization.
Electricity billing, Electrical load management and maximum demand control, Power factor
improvement and its benefit, Selection and location of capacitors, Performance assessment of PF
capacitors, Distribution and transformer losses, Introduction to Energy Efficient Technologies in
Electrical Systems: Maximum Demand controllers, Automatic power factor controllers, Energy
efficient motors, Soft starters, Variable speed drives, Energy efficient transformers, Electronic ballast,
Occupancy sensors, Energy efficient lighting controls, Energy saving potential of each technology.
SCADA, Energy Management System (EMS) and Building Management System (BMS) systems

5. Energy Audit

Definition, Energy audit-need, Types of energy audit, Energy management (audit) approach-
understanding energy costs, Bench marking, Energy performance, Matching energy use to
requirement, Maximizing system efficiencies, Optimizing the input energy requirements, Fuel and
energy substitution, Energy audit instruments: Audit of installations comprising following with
respect to their electrical energy usage: Electric motors, HVAC systems, Fan and blowers systems,
Compressed air systems Pumps, DG sets, Lighting installations etc. Evaluation of energy
conservation opportunities. Energy conservation in buildings, Economic and non economic aspects of
energy conservation in electrical systems

6. Use of Renewable and Green building Concept

Impact of renewable energy sources in electrical system design, Concept of green building and its
accreditation

Reference Books :

1. Handbook of Electrical Installation Practice (*Geofry Stokes*) Blackwell Science
2. Designing with light: Lighting Handbook (*Anil Valia*) Lighting System
3. Energy Management Handbook (*W.C. Turner*) John Wiley and Sons
4. Handbook on Energy Audits and Management (*Amit Kumar Tyagi*) Tata Energy Research Institute (TERI).
5. Energy Auditing Made Simple (*P.Balasubramanian*) Separation Engineers (P) Limited
6. Energy Management Principles (*C.B.Smith*) Pergamon Press
7. Energy Conservation Guidebook (*Dale R. Patrick, Stephen Fardo, Ray E. Richardson*) Fairmont Press
8. Handbook of Energy Audits (*Albert Thumann, William J. Younger, Terry Niehus*) CRC Press

Websites :

1. www.energymanagertraining.com
2. www.bee-india.nic.in

