

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. SEMESTER : VIII

ELECTRICAL ENGINEERING

Subject Name: **POWER SYSTEM PRACTICE AND DESIGN**

Sr. No.	Course Contents	Total Hrs
1.	Transmission Line Design: Electrical design of transmission line Design philosophy, voltage level selection and choice of conductors, spacing of conductor and corona, insulators and SIL, design problem. Mechanical design of transmission line: Considerations, loading on conductors, span, sag and tension clearance, stringing, problems. Transmission line tower design: Location of tower, earth wires, reduction of tower footing resistance, design of tower, examples. EHV transmission line design: Considerations, selection, spacing of conductors, corona and radio interference, shunt and series compensation, tuned power lines, insulation coordination and different types of EHV towers, EHV systems in India.	10
2.	AC and DC Low Tension Distribution Design: Types of distribution systems: arrangements, selection and size of feeders using Kelvin's law, design of cables in distribution systems considering ampere capacity, voltage drop during starting and running load, primary distribution design, secondary distribution design. HV distribution design concept, load balancing Distribution substation, Calculation of distributor size and its examples, calculation of voltage drops and size of distributor in ring system. Voltage regulation and lamp flicker.	10
3.	Substation Design: Determination of voltage regulation and losses in power system, shifting of distribution transformer centre, Substation layout, sizes and locations of sub stations, Substation equipments specifications ratings and its operation from design view point, Cathodic Protection, Gas Insulated Substation (GIS).	06
4.	Power System Earthing – Power Station and Sub Station Earthing Objectives, definitions, tolerable limits of body currents, soil resistivity, measurement of soil resistivity, earth resistance, measurement of earth resistance, tolerable step and touch voltage, actual step and touch voltage, design of earthing grid, impulse behaviour of earthing system.	05
5.	Design of Power Station: Introduction, selection of sizes and location of generating stations, interconnections issues with wind and Solar PV.	03
6.	Insulation Coordination and Location of Lightning Arrestor : Introduction, definitions, insulation-co-ordination curves, determination of line insulation, Basic Insulation level (BIL), Insulation levels of substation equipments, Lightning arrestor selection and location, Selection of arrestor voltage rating, arrestor discharge voltage and arrestor discharge current, protective margin.	05
7.	HVDC Transmission: Merits and demerits of HVDC transmission, one line diagram, types of DC link, necessary equipments, operation and control, applications, recent advances, HVDC in India.	03

Note: It is suggested that based on the above syllabus, visits for LT/HT Electrification and 220KV/ 400 KV substations should be carried out.

Books:

1. Electrical Power System Design – M. V. Deshpande, TMH publication
2. Electrical Power System Design – B. R. Gupta, S. CHAND
3. Electrical Power System Planning – A. S. Pabla, TMH publication
4. Substation Design – Satnam & Gupta, Dhanpat Rai and Co.
5. A course in Electrical Power- Soni,,Gupta and Bhatnagar, Dhanpat Rai & Sons