

Course Title: Power Apparatus and Systems

Course Code: EPEG 301

Credit Hours: 3

Course Description:

This course provides an overview and fundamentals of Electric Power System to Communication Engineering students.

Course Contents:

Unit 1: Introduction to Power Systems

Historical developments, Basic structure; Power generation: Thermal, Hydro & nuclear power plants; Non-conventional futuristic energy sources; Energy storage and conservation facilities

Unit 2: Supply Systems

Introduction to electric supply system, Effect of system voltage on line efficiency, comparison of various supply systems, AC power supplies scheme, Choice of system voltage, Conductor size and Kelvin's law

Unit 3: Distribution Systems

DC distribution system- radial and ring mains, three wire systems, interconnected systems; AC distribution systems-method of calculations with concentrated load

Unit 4: Transmission Systems

AC & DC transmission, Overhead and cable transmission schemes, Hardware aspects characteristics and performance short, Medium and long lines, Ferranti effect, Equivalent circuit of a long line, Power flow through a transmission line.

Unit 5: Mechanical Design of Overhead Lines

Main component of overhead lines, Conductor materials; Types of insulator- pin type, Suspension type, strain insulators, Shackle insulator; Corona; Calculation of sag and tension

Unit 6: Major Electrical Equipments in Power Stations

Generators and exciters; Earthing of power system; Power transformers— types and characteristics selection and specifications; Principles of circuit interruption, Circuit breakers types and characteristics, selection and specifications; Layout of electrical equipment; Current limiting reactor-use and location

Unit 7: Protective Relaying for Power Systems

Principles and characteristics of protection relaying, Theory and classification of relays, AC generator protection, Busbar protection

References:

1. V.K. Mehta, *Principles of Power Systems*, S. Chand Co.
2. Asfaq Husain, *Electrical Power Systems*, Dhanpat Rai & Co.