Course Name	Power System-I
Course Code	EE502
Course Credit	4
Contact Hour	3L-1T
Prerequisite	Basic Electrical Engineering (EE 101), Machine- I (EE401), Circuit Theory and Networks (EE301)

Course Objective

The objectives of this course are

1. To prepare students to analysis of Electrical Power system Network to implement in Power Industry.
2. To teach and learn basic structure of power system networks, its different voltage levels and how power has been generated, transmitted and distributed to load area, so that empower students to understand the working of principal of power system network which is used in daily life to run electrical equipments which are used in everyday life.
3. To expose the students to the concepts of various types power generation process and get concept of environment friendly generation(Renewable Generation)
4. To develop a creative mindset towards innovation and entrepreneurship that serve to the need of the industry and society and to grow the quality like skill, team work, leadership and professional ethics, thus contributing towards the growth and development of society and power Industry.

Course Outcome

On completion of the course students will be able to

1. Prepare them for power industry and develop skills to build them to design and specification of generation station, transmission lines and power distributions to get ready for job market
2. Introduce the concepts and phenomenon of different sources of power generation, insulators.
3. Understand and acquire knowledge about various power generation.
4. Prepare the students to analyze and design different power transmission lines.
5. Study the various applications of power system to practical industrial applications, home appliances, power supply and measure the flow of power.
6. Familiarize the students with the tariff methods for electrical energy consumption in the prospect of optimum utilization of electrical energy.

CO Mapping with departmental POs

H: High, M: Medium, L: Low

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	H	H	M	H	M	M	M					
CO 2	H	M	L		H	M			L			
CO 3	H	H	M	H								
CO 4			M	H								
CO 5	H		H			H	H		L			
CO 6	H	H		H		L	M					

Course Content

Module –I: Overhead transmission line: 12L

Overhead transmission line: Choice of frequency, Choice of voltage, Types of conductors, Inductance and Capacitance of a single phase and three phase symmetrical and unsymmetrical configurations. Bundle conductors. Transposition. Concept of GMD and GMR. Influence of earth on conductor capacitance.

Overhead line construction: Line supports, Towers, Poles, Sag, Tension and Clearance, Effect of Wind and Ice on Sag. Dampers.

Module-II: 10L

Insulators: Types, Voltage distribution across a suspension insulator string, String efficiency, Arching shield & rings, Methods of improving voltage distribution across Insulator strings, Electrical tests on line Insulators.

Corona: Principle of Corona formation, Critical disruptive voltage, Visual critical corona discharge potential, Corona loss, advantages & disadvantages of Corona. Methods of reduction of Corona

Cables: Types of cables, cable components, capacitance of single core & 3 core cables, dielectric stress, optimum cable thickness, grading, dielectric loss and loss angle.

Module-III 8L

Performance of lines: Short, medium (nominal, T) and long lines and their representation. A.B.C.D constants, Voltage regulation, Ferranti effect, Power equations and line compensation, Power Circle diagrams.

Module-IV 10L

Generation of Electric Power:

General layout of a typical coal fired power station, Hydro electric power station, and Nuclear power station, their components and working principles, comparison of different methods of power generation. Introduction to Solar & Wind energy system.

Tariff: Guiding principle of Tariff, different types of tariff.

Indian Electricity Rule-1956: General Introduction.

Text Books

1. Electrical Power System, Subir Roy, Prentice Hall
2. Power System Engineering, Nagrath & Kothery, TMH
3. Elements of power system analysis, C.L. Wodhwa, New Age International.
4. Electrical Power System, Ashfaq Hussain, CBS Publishers & Distributors
5. Principles of Power System,V.K.Meheta & Rohit meheta,S.Chand & Company Ltd.

Reference Books

1. Electric Power transmission & Distribution, S.Sivanagaraju, S.Satyanarayana, Pearson Education.
2. A Text book on Power system Engineering, Soni, Gupta, Bhatnagar & Chakrabarti, Dhanpat Rai & Co.
3. Electric Power distribution system Engineering, 2nd Edition, T. Gonen, CRC Press.