

ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION

Course Code	20EE3503	Year	III	Semester(s)	I
Course Category	Professional Core	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Circuit Theory
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Understand the basic concepts of electrical power generation, transmission and distribution. (L2)
CO2	Apply the principles of physical sciences to understand the working of conventional and non-conventional power plants. (L3)
CO3	Compute the transmission line parameters, sag of an overhead transmission line and string efficiency of insulators. (L3)
CO4	Analyze the performance of various types of transmission lines and distribution system topologies. (L4)
CO5	Illustrate the different types of insulators, underground cables and effect of corona. (L3)
CO6	Get the ability to engage in independent study to make an effective presentation and submit report on generation, transmission and distribution concepts in various domains.

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Medium, 1:Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	1					1	1					1	2	1
CO3	2		1			1							2	1
CO4		2										2	2	1
CO5	2						1						2	1
CO6	3	3							3	3			2	1

SYLLABUS		
Unit No.	Contents	Mapped CO
I	Conventional and Non-conventional power Generation: General layout, working and site selection of thermal power plant, hydroelectric power plant, nuclear power plant and pumped storage plants. Introduction to Non-Conventional Sources Solar Energy, wind Energy (descriptive treatment only)	CO 1 CO 2 CO 6
II	Transmission Line parameters: Calculation of resistance, Skin effect, Proximity effect. Calculation of inductance of single phase, three phase lines with symmetrical spacing. Inductance of composite conductor lines.	CO 1 CO 3 CO 6

	Capacitance - Calculation for single phase two wire line, capacitance calculation for 3 phase lines with symmetrical spacing.	
III	<p>Performance of Transmission Lines: Classification of lines, Medium Transmission lines - nominal T method, nominal π method and long transmission lines – Rigorous solution method, ABCD constants of Transmission lines, calculation of voltage regulation and transmission efficiency, Ferranti effect.</p> <p>Sag, Tension Calculations: Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice on weight of Conductor, Numerical Problems.</p>	<p>CO 1 CO 3 CO 4 CO 6</p>
IV	<p>Insulators: Types, potential distribution over a string of suspension insulators. String efficiency and methods of increasing string efficiency.</p> <p>Corona: Phenomena, disruptive and visual critical voltages and corona power loss (Descriptive treatment only).</p> <p>Underground Cables: Types, material used. Insulation resistance, Grading of cables - capacitance grading and inter sheath grading (Descriptive treatment only).</p>	<p>CO 1 CO 3 CO 5 CO 6</p>
V	<p>D.C. Distribution Systems: Classification of Distribution Systems, Voltage Drop Calculations in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) and Ring Main Distributor.</p> <p>A.C. Distribution Systems: Voltage Drop Calculations in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.</p>	<p>CO 1 CO 4 CO 6</p>

Learning Resources

Text Books

1. J.B.Gupta, Transmission and Distribution of Electrical Power -S.K.Kataria and sons,10th edition, 2012
2. Dr. S. N. Singh, Electric power generation Transmission & Distribution- PHI learning Pvt Ltd, New Delhi, 2nd Edition, 2010

Reference Books

1. Mehta, Rohit, et al. Principles of Power System: Including Generation, Transmission, Distribution, Switchgear and Protection, S. Chand, 4th Edition, 2005.
2. Generation, Distribution and Utilization of Electrical Energy, C.L.Wadhwa, New Age International publishers, 6th Edition 2018.
3. I.J.Nagarath & D.P. Kothari, “Power System Engineering”, 3e. N.p., McGraw-Hill Education, 2019.

Web Links

1. <https://nptel.ac.in/courses/108102047>