

POWER SYSTEMS-II

Course Code	23EE3503	Year	III	Semester	I
Course Category	Professional Core	Branch	EEE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	PS-I, ECA
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 concepts of electrical and mechanical design traits of transmission lines (L2).
CO2	Apply electromagnetic principles to determine transmission line parameters and evaluate line performance (L3).
CO3	Analyze the effects of various conductor configurations on transmission line parameters and performance (L4).
CO4	Identify the surge and mechanical behavior of transmission lines (L3).
CO5	Analyze the effects of line configuration on the performance of transmission lines (L4).
CO6	Prepare a report on the electrical and mechanical aspects of transmission line design

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	3												2	1
CO3		3										1	2	1
CO4	3												2	1
CO5		3										1	2	1
CO6				3					2	2		2		

SYLLABUS		
Unit No.	Contents	Mapped CO
I	Transmission Line Parameters Calculations Conductor materials – Types of conductors – Calculation of resistance for solid conductors – Calculation of inductance for Single-phase and Three-phase single and double circuit lines– Concept of GMR and GMD–Symmetrical and asymmetrical conductor configuration with and without transposition–Bundled conductors, Skin and Proximity effects. Calculation of capacitance for 2 wire and 3 wire systems – Effect of ground on capacitance – Capacitance calculations for symmetrical and asymmetrical single and	CO1 CO2 CO3 CO6

	Three-phase single and double circuit lines without and with Bundled conductors.	
II	Performance Analysis of Transmission Lines Classification of Transmission Lines – Short, medium, long lines and their model representation –Nominal-T, Nominal- π and A, B, C, D Constants for symmetrical Networks. Rigorous Solution for long line equations –Representation of Long lines – Equivalent T and Equivalent π network models - Surge Impedance and Surge Impedance Loading of Long Lines - Regulation and efficiency for all types of lines – Ferranti effect.	CO1 CO2 CO3 CO6
III	Power System Transients Types of System Transients – Propagation of Surges – Attenuation–Distortion–Reflection and Refraction Coefficients. Termination of lines with different types of conditions: Open Circuited Line–Short Circuited Line, Line terminated through a resistance and line connected to a cable. Reflection and Refraction at a T-Junction.	CO1 CO4 CO5 CO6
IV	Corona& Effects of transmission lines Description of the phenomenon – Types of Corona - critical voltages and power loss – Advantages and Disadvantages of Corona - Factors affecting corona - Radio Interference.	CO1 CO4 CO5 CO6
V	Sag and Tension Calculations and Overhead Line Insulators: Sag and Tension calculations with equal and unequal heights of towers–Effect of Wind and Ice weight on conductor – Stringing chart and sag template and its applications. Types of Insulators – Voltage distribution in suspension insulators–Calculation of string efficiency and Methods for String efficiency improvement – Capacitance grading and Static Shielding.	CO1 CO4 CO5 CO6

Learning Resources	
Text Books:	
1. C.L.Wadhwa, “Electrical Power Systems” ,New Age International (P) Limited,6 th Edition, 2009. 2. I.J. Nagarath & D.P. Kothari, “Power System Engineering”, McGraw-Hill Education, 3rd Edition, 2019.	
Reference Books:	
1. John J Grainger William D Stevenson, “Power system Analysis”,, TMC Companies, 4 th edition 1994 2. B.R.Gupta, “Power System Analysis and Design”, B.R.Gupta, Wheeler Publishing. 3. M.L.Soni, P.V.Gupta, U.S.Bhatnagar ,A.Chakrabarthy, “ A Text Book on Power System Engineering”, DhanpatRai Co Pvt. Ltd.2016. 4. P.S.R. Murthy, “Electrical Power Systems” , B.S. Publications, 2017.	
E-Resources:	
1. https://archive.nptel.ac.in/courses/108/105/108105104 2. https://archive.nptel.ac.in/courses/108/102/108102047	