SCHEME OF COURSE WORK

Course Details:

Course Title	**: POWER TRANSMISSION ENGINEERING**		
Course Code	**:13EE1112**	L T P C	**4 1 0 3**
Program:	**: B.Tech.**		
Semester	**: V**		
Prerequisites	**:Basic Network Analysis,**		
Courses to which it is a prerequisite	**SGP,UEE,PSA**		

Course Outcomes (COs):

1	Calculate resistance, inductance and capacitance value of transmission line.
2	Analyze different types of transmission line and also calculate efficiency and regulations of the transmission lines.
3	Analyze the different waves and transients in power systems and calculate the corona.
4	Describe different insulators and calculate string efficiency and sag.
5	Describe the different types of cables.

Program Outcomes (POs):

A graduate of Electrical & Electronics Engineering will be able to

1	Apply the knowledge of basic sciences and electrical and electronics engineering fundamentals to solve the problems of power systems and drives.
2	Analyse power systems that efficiently generate, transmit and distribute electrical power in the context of present Information and Communications Technology.
3	Design and develop electrical machines and associated controls with due considerations to societal and environmental issues.
4	Design and conduct experiments, analyze and interpret experimental data for performance analysis.
5	Apply appropriate simulation tools for modeling and evaluation of electrical systems.
6	Apply the electrical engineering knowledge to assess the health and safety issues and their consequences.
7	Demonstrate electrical engineering principles for creating solutions for sustainable development.
8	Develop a techno ethical personality that help to serve the people in general and Electrical and Electronics Engineering in particular.
9	Develop leadership skills and work effectively in a team to achieve project objectives.
10	Communicate effectively in both verbal and written form.
11	Understand the principles of management and finance to manage project in multi-disciplinary environments.
12	Pursue life-long learning as a means of enhancing the knowledge and skills.

Course Outcome Versus**Program Outcomes:**

COs\POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO-1	S	S		S	S	M	S	M	M			M
CO-2	S	S		S	S	M	S	M	M			M
CO-3	S	S		S	S	M	S	M	M			M
CO-4	S	S		S	S	S	S	M	M			M
CO-5	S	S		S	S	S	S	M	M			M

S - Strongly correlated, *M - Moderately* correlated, *W-Weakly correlated*

AssessmentMethods:	Assignment / Quiz / Seminar / Group Discussions / Case Study / Mid-Test / End Exam

Scheme of Course Work

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	SERIES IMPEDANCE AND CAPACITANCE OF TRANSMISSION LINE: Types of conductors, calculation of resistance, skin effect, Calculation of inductance for single phase two-wire line, composite-conductor lines, inductance of three-phase lines with equilateral and unsymmetrical spacing, bundled conductors and parallel circuit three-phase lines.	CO-1	1. What are the advantages of bundled conductors? 2. Derive expression for inductance of a 3 phase transmission line which is transposed with ground effect neglected with unsymmetrical spacing?	Lecture/Discussion	Assignment-1 Aug-15
2	Capacitance of a two-wire line, three-phase lines with equilateral and unsymmetrical spacing, Effect of earth on the capacitance of three-phase transmission lines, bundled conductors and parallel circuit three-phase lines, An introduction to per unit systems.	CO-1	1. Derive expression for capacitance of a 3 phase transmission line which is transposed with ground effect neglected with unsymmetrical spacing? 2. Define Per Unit System and mention its importance?	Lecture/Discussion	Assignment-1 Aug-15
3	Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks, Numerical Problems.	CO-2	1. Define transmission Efficiency & Regulation? 2. Write down the generalized circuit constants of a medium transmission line by Nominal – T method ?	Lecture/Discussion	Assignment-1 Aug-15
4	Mathematical Solutions to estimate regulation and efficiency of all types of lines - Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants, Interpretation of the Long Line Equations, Incident, Reflected and Refracted Waves - Surge Impedance and SIL of Long Lines	CO-2	1. Why effect of capacitance is neglected in a short transmission line? 2.What is the significance of A,B,C,D constants of a transmission line? Determine the generalized constants of a long transmission line	Lecture/Discussion	Assignment-1 Aug-15
5	Wave Length and Velocity of Propagation of Waves - Representation of Long Lines - Equivalent-T and Equivalent Pie network models	CO-3	1. Derive an expression for finding the sending end voltage and current of a long transmission line using rigorous solution?	Lecture/Discussion	Assignment-1 Aug-15
6	Types of system transients, travelling waves and propagation of surges: reflection and refraction of travelling waves, reflection and refraction at a t-junction	CO-3	1. Derieve the coefficients of reflection and refraction of voltage and current when a transmission line is open circuited? 2. Derieve the coefficients of reflection and refraction of voltage and current when a transmission line is short circuited?	Lecture/Discussion	Quiz-1 Aug-15

7	lumped reactive junction, attenuation and distortion of travelling waves, bewley lattice diagram.	CO-3	1. Derive the expression for velocity of travelling waves through a loss less line? 2. What are the reflection and refraction coefficients of voltage and current for a line terminated with surge impedance?	Lecture/Discussion	Quiz-1 Aug-15
8	**MID-1**				
9	Critical disruptive voltage, conditions affecting corona, corona loss, practical importance of corona	CO-3	1. A certain 3 phase equilateral transmission line has a total corona loss of 53KW at 106KV and a loss of 98KW at 110.9KV. What is the disruptive critical Voltage? What is the corona loss at 113KV	Lecture/Discussion	Assignment-2 Oct-15
10	Types of Insulators, Potential Distribution over a String of Suspension Insulators, Methods of Equalizing Potential	CO-4	1. What are the methods to improve string efficiency? Define String Efficiency	Lecture/Discussion	Assignment-2 Oct-15
11	Insulation Failure, Testing Of Insulators, Sag and Tension Calculations	CO-4	1. Explain potential distribution over suspension insulator with 4 insulator strings?	Lecture/Discussion	Assignment-2 Oct-15
12	Sag and Tension Calculations with equal and unequal heights of towers, Effect of Wind and Ice, Stringing chart and sag template.	CO-4	1. What is the value of sag when supports are at equal levels and unequal levels?	Lecture/Discussion	Assignment-2 Oct-15
13	Types of cables, capacitance of single-core cable, grading of cables	CO-5	1. Obtain the expression for dielectric stress in a single core cable?	Lecture/Discussion	Quiz-2 Oct-15
14 &15	Power factor and heating of cables, capacitance of 3-core belted cable, D.C. Cables.	CO-5	1. What is the function of armouring in underground cable? 2. Explain the construction of underground cables?	Lecture/Discussion	Quiz-2 Oct-15
16	**MID-2**	-	-	-	-
17	**No Class Work**				
	END EXAM				