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Department of Electrical Engineering	
Electric Power Systems I (63422)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Electrical Machines II (63324)

Course Contents

Series impedance of transmission lines. Capacitance of transmission lines. Current and voltage relations on a transmission line. System modeling. Network calculations. Introduction to load flow solutions.

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	The ability to Understand the equivalent circuit of transmission lines.	A	45 %
2	The ability to Learn the concept of one line diagram, impedance and reactance diagrams.	C	25 %
3	3 The ability to Learn matrix analyses methods and load flow analyses of power systems	E	30 %

Textbook and/ or Refrences

Elements of power system analyses. William D. Stevenson, J. McGraw-Hill, 1982. &Power system analysis: John J Grainger and William D. Stevenson, J. R. McGraw-Hill, 1994. &Principles of power system. V.K.Mehta, and Rohit Mehta. S.CHAND &COMPANY LTD.2005.

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Homeworks	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	SEREIS IMPEDANCCE OF TRANSMISSION LINES: Resistance, inductance, inductance of single-phase two wire line, inductance of composite conductor lines, the use of tables.
2	SEREIS IMPEDANCCE OF TRANSMISSION LINES: Inductance of three phase lines, bundled conductors. Parallel circuit three phase lines. Solving different problems.
3	CAPACITANCE OF TRANSMISSION LINES: Electric field of a conductor. The concept of electric flux density and electric field intensity. Capacitance of single-phase two wire line.
4	CAPACITANCE OF TRANSMISSION LINES: Capacitance of three phase lines, bundled conductors. Parallel circuit three phase lines. Solving different problems.
5	CURRENT AND VOLTAGE RELATIONS ON A TRANSMISSION LINE: The short transmission line, the medium-length transmission line. Power flow through a TL.
6	CURRENT AND VOLTAGE RELATIONS ON A TRANSMISSION LINE: Reactive power compensation of T.L, T.L transients, direct-current transmission. Solving different problems.
7	MIDTERM EXAM I
8	SYSTEM MODELING: The synchronous machine, the transformer, the autotransformer, three phase transformers.
9	SYSTEM MODELING: Three winding transformer, per unit impedances. The one-line diagrams.

10	NETWORK CALCULATIONS: Node equations, matrix partitioning, node elimination by matrix algebra. The bus admittance matrix.
11	NETWORK CALCULATIONS: The bus impedance matrix, modification of an existing bus impedance matrix, direct determination of a bus impedance matrix. Solving different problems.
12	MIDTERM EXAM 2
13	INTRODUCTION TO LOAD FLOW SOLUTIONS: Introduction, power flow equations and power flow problem.
14	INTRODUCTION TO LOAD FLOW SOLUTIONS: Iteration schemes accelerated Gauss-Seidel, Newton-Raphson Methods. Solving problems