POWER SYSTEM COMPUTATIONAL LABORATORY

I Semester: EPS

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BPSB09	Core	-	-	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 48				Total Classes: 48		

I. COURSEOVERVIEW:

The main objective of the course is to provide a software-based power system analysis. This lab course will provide the computer-based formation of bus admittance matrix. It will also analyze the transient stability and load dispatch problem. It will also cover state estimation of power system and unit commitment problem.

II.COURSE OBJECTIVES:

The course should enable the students to:

I. Construct Y bus, Z bus for a n bus system and analyze various load flow studies.
II. Understand the steady state, transient stability analysis and economic load dispatch problem.
III. State estimation of power system and UNIT commitment problem.

III.COURSEOUTCOME:

After successful completion of the course, students will be able to:		
CO 1	**Understand** the concept of Admittance matrix for the formulation of various inspection and transformation methods.	Understand
CO 2	**Develop** the programming for load flow algorithms.	Apply
CO 3	**Analyze** the characteristics of fast decoupled loaf flow methods for developing algorithm.	Analyze
CO 4	**Analyze** the features of various algorithms applicable for protection of Transformers and transmission lines.	Apply
CO 5	**Categorize** the transient and short circuit analysis for analysing the performance of the system.	Analyze
CO 6	**Analyze** the various iterative methods applicable for state estimation of the power system.	Analyze

I.

IV. LIST OF EXPERIMENTS

Expt. 01	**FORMATION OF BUS ADMITTANCE MATRIX**
Develop program for Y_{bus} formation by direct inspection method.	
Expt. 02	**SINGULAR TRANSFORMATION**
Develop program for Y_{bus} formation by singular transformation method**.**	
Expt. 03	**GAUSS - SEIDAL LOAD FLOW METHOD**
Develop program for G-S load flow algorithm	
Expt. 04	**NEWTON - RAPHSON LOAD FLOW METHOD**
Develop program for N-R load flow algorithm in polar coordinates	
Expt. 05	**FAST DECOUPLED LOAD FLOW METHOD**

Develop program for FDLF algorithm.	
Expt. 06	**DC LOAD FLOW**
Develop program for DC load flow algorithm.	
Expt. 07	**BUILDING ALGORITHM**
Develop Program for Z_{BUS} building algorithm.	
Expt. 08	**SHORT CIRCUIT ANALYSIS**
Develop program for short circuit analysis using Z_{BUS} algorithm.	
Expt. 09	**TRANSIENT STABILITY**
Develop program for transient stability analysis for single machine connected to infinite bus	
Expt. 10	**LOAD DISPATCH PROBLEM**
Develop program for economic load dispatch problem using lambda iterative method	
Expt. 11	**DYNAMIC PROGRAMMING METHOD**
Develop program for UNIT commitment problem using forward dynamic programming method.	
Expt. 12	**STATE ESTIMATION**
Develop program for state estimation of power system.	

Reference Books:

1. DP Kothari, B S Umre, "Lab manual for Electrical Machines", IK International Publishing House Pvt. Ltd, 1st Edition,1996.
2. MariesaLCrow, "Computational Methods for Electric Power Systems (Electric Power Engineering Series)", CRC Press Publishers, 1st Edition,1992.

Web References:

1. https://www.ee.iitkgp.ac.in
2. https://www.citchennai.edu.in
3. https://www.iare.ac.in
4. https://www.deltaww.com