COURSE CONTENT

POWER SYSTEM COMPUTATIONAL LABORATORY								
I Semester: EPS **II Semester:** EEE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
BPSD11	**Core**	-	-	4	2	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 36**				**Total Classes: 36**		
Prerequisite: Power System Computational								

I. COURSE OVERVIEW:

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. COURSES OBJECTIVES:

The students will try to learn:

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

III. COURSE OUTCOMES:

After successful completion of the course students should be able to:

CO1	Understand the concept of Admittance matrix for the formulation of various inspection and transformation methods.
CO2	Develop the programming for load flow algorithms.
CO3	Analyze the characteristics of fast decoupled loaf flow methods for developing algorithm.
CO4	Analyze the features of various algorithms applicable for protection of Transformers and transmission lines.
CO5	Categorize the transient and short circuit analysis for analysing the performance of the system.
CO6	Analyze the various iterative methods applicable for state estimation of the power system.

IV. LIST OF EXPERIMENTS:

Week1: FORMATION OF BUS ADMITTANCE MATRIX
Develop program for Ybus formation by direct inspection method.

Week2: SINGULAR TRANSFORMATION
Develop program for Ybus formation by singular transformation method.

Week 3: GAUSS - SEIDAL LOAD FLOW METHOD
Develop program for G-S load flow algorithm

Week 4: NEWTON - RAPHSON LOAD FLOW METHOD
Develop program for N-R load flow algorithm in polar coordinates.

Week 5: FAST DECOUPLED LOAD FLOW METHOD
Develop program for FDLF algorithm.

Week 6: DC LOAD FLOW
Develop program for DC load flow algorithm.

Week 7: BUILDING ALGORITHM
Develop Program for ZBUS building algorithm

Week 8: SHORT CIRCUIT ANALYSIS
Develop program for short circuit analysis using ZBUS algorithm.

Week 9: TRANSIENT STABILITY
Develop program for transient stability analysis for single machine connected to infinite bus.

Week 10: LOAD DISPATCH PROBLEM
Develop program for economic load dispatch problem using lambda iterative method.

Week 11: DYNAMIC PROGRAMMING METHOD
Develop program for unit commitment problem using forward dynamic programming method.

Week 12: STATE ESTIMATION
Develop program for state estimation of power system.

V. TEXTBOOKS:

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

VI. SOFTWARE AND HARDWRE REQUIREMENT OR STUDENTS

System Software: MATLAB