Course Number and Name
BEE701 & POWER SYSTEM ANALYSIS

Credits and Contact Hours
4 & 60

Course Coordinator's Name
Dr.V.Jayalakshmi

Text Books and References

Text Books:
1. J.J Nagrath& D.P Kothari, 'Modem Power System Analysis', Tata McGraw Hill, New Delhi, 1989.
2. John J. Graigner and Stevenson Jr.W.D., 'Power System Analysis'. McGraw Hill International Edition, 1994.

References:
1. Stevenson WD , 'Elements of Power System Analysis', Tata McGraw Hill, 1952.
2. MA Pai, 'Computer Techniques in Power System Analysis', Tata McGraw Hill. New Delhi, 1979.
3. http://nptel.ac.in/courses/108105067/

Course Description
To model various power system components and carry out load flow, short circuit and stability studies.

Prerequisites	Co-requisites
Transmission and Distribution	Nil
required, elective, or selected elective (as per Table 5-1)	
Required	

Course Outcomes (COs)

CO1: Create computational models for analysis power systems and able to understand per unit system
CO2: Perform load flow computations and analyze the load flow results.
CO3: Analyse a power system network under Symmetrical Conditions.
CO4: Understand Positive Sequence, Negative & zero sequence system and fault analysis.
CO5: Analyze power system operation and stability control.

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	M	H	M	M	M	M	L	L	L	M
CO2	H	H	M	H	H	H	M	M	L	M	L	M
CO3	H	H	H	H	H	H	M	H	L	M	L	M
CO4	H	H	H	H	H	M	M	H	L	M	L	M
CO5	H	H	M	H	H	H	M	M	L	M	L	M

List of Topics Covered

UNIT I   POWER SYSTEM COMPONENTS   12
Power System Model: Representation-Single Line Diagram-Per unit Quantities-Per unit impedance diagram-Primitive network and its matrices, Network formulation using bus admittance matrix and bus impedance matrix-Symmetrical Components-Sequence impedance and networks.

UNIT II   LOAD FLOW STUDIES   12
Primitive network equation-Incidence Bus Matrix. Power flow studies: Formulation of Power flow equations using Y-bus matrix-power flow analysis-Guass-Seidal and Newton Raphson Methods-Handling of Voltage Controlled Buses Off nominal transformer ratios and phase shifting transformer-Fast Decoupled Method.

UNIT III   SYMMETRICAL FAULT ANALYSIS   12
Symmetrical Short Circuit Analysis: Types of faults in power systems-Analysis of Symmetrical faults-short circuit capacity-symmetrical fault analysis through Z-bus.

UNIT IV   UNSYMMETRICAL FAULT ANALYSIS   12
Unsymmetrical Short Circuit Analysis: Unsymmetrical faults in Power Systems-Analysis of single line to ground, line to line and double line to ground faults power systems using Z-bus.

UNIT V   POWER SYSTEM STABILITY   12
Stability Analysis: Steady state and transient Stability limits-Swing equation for single machine infinite bus system-Equal area criterion- Critical clearing angle and time-Solution of swing equation by modified Euler and Runge-kutta methods Stability analysis of multi machine power system. Techniques for stability Improvement