VIKASH INSTITUTE OF TECHNOLOGY, BARGARH

LESSON PLAN

Semester: 6th		**Year: 3rd**	**Course: B.Tech**
Branch : EEE		**Sub: Power System Operation & Control** **Sub Code : REL6D001**	**Total Credit:03**
Name of the Faculty:		**Dr. Dillip Khamari**	
Designation :		**Associate Professor**	
Department :		**EEE**	
Session		**2024-25**	
Recommended Books		**Text book**: **1 J. Grainger and W. D. Stevenson, "Power System Analysis", McGraw Hill Education, 1994.** **2 O. I. Elgerd, "Electric Energy Systems Theory", McGraw Hill Education, 1995.** **Reference Books**: **1 D. P. Kothari and I. J. Nagrath, "Modern Power System Analysis", McGraw Hill Education, 4th Edition, 2011.** **2 Power System Analysis- By Hadi Saadat, TMH, 2002 Edition, Eighth Reprint.**	
Sl. No.	**Lecture No.**	**Topics to be covered**	**No. of Classes**
		MODULE-1:	
1	Lecture-01	Review of the structure of a Power System and its components.	**10**
2	Lecture-02	Per unit calculations.	
3	Lecture-03	Analysis of Power Flows: Formation of Bus Admittance Matrix.	
4	Lecture-04	Real and reactive power balance equations at a node.	
5	Lecture-05	Load and Generator Specifications.	
6	Lecture-06	Application of numerical methods for solution of nonlinear algebraic equations	
7	Lecture-07	Gauss Seidel method for the solution of the power flow equations.	
8	Lecture-08	Newton-Raphson method for the solution of the power flow equations.	
9	Lecture-09	Coupled and Decoupled Newton-Raphson methods for the solution of the power flow equations.	
10	Lecture-10	Regulating Transformers.	
		MODULE-2:	
11	Lecture-11	Economic Operation and Management of Power System	**8**
12	Lecture-12	Basic Pricing Principles: Generator Cost Curves, Utility Functions,	
13	Lecture-13	Economic Operation without Transmission losses	
14	Lecture-14	Economic Operation with Transmission losses	
15	Lecture-15	Transmission loss coefficient	
16	Lecture-16	Economic Dispatch, Unit Commitment	
17	Lecture-17	Function of Load Dispatch Centres.	
18	Lecture-18	Demand side-management.	

MODULE-3:			
19	Lecture-19	Control of Frequency and Voltage	**10**
20	Lecture-20	Turbines and Speed-Governors	
21	Lecture-21	Frequency dependence of loads	
22	Lecture-22	Droop Control and Power Sharing.	
23	Lecture-23	Automatic Generation Control.	
24	Lecture-24	Generation and absorption of reactive power by various components of a Power System.	
25	Lecture-25	Excitation System Control in synchronous generators	
26	Lecture-26	Automatic Voltage Regulators	
27	Lecture-27	ALFC of Single Area Systems	
28	Lecture-28	ALFC of Two Area Systems	
MODULE-4:			
29	Lecture-29	Power System Stability	**12**
30	Lecture-30	The Stability Problem	
31	Lecture-31	Rotor Dynamics	
32	Lecture-32	The Swing Equation	
33	Lecture-33	The Power-Angle Equation	
34	Lecture-34	Synchronizing Power Coefficients	
35	Lecture-35	Equal-Area Criterion for Stability	
36	Lecture-36	Multi-machine Stability Studies	
37	Lecture-37	Classical Representation,	
38	Lecture-38	Step-By-Step Solution of the Swing Curve	
39	Lecture-39	Problem practice	
40	Lecture-40	Factors Affecting Transient Stability	

Signature of Faculty Member **Signature of HOD**

PRINCIPAL