

Department of Electrical Engineering

SOET, BGSBU Rajouri

Course: Power Systems-II

Course code: PCC-EE-501

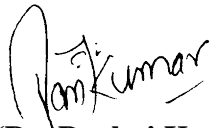
Academic session: July-Dec.2020

Semester: Vth

Lecture Plan

Units	Topic	Lectures Required (Tentative)	Date & Time
Unit-I: Power Flow Analysis	Review of the structure of a Power System and its components.	1	18-08 & 12-13 hrs
	Analysis of Power Flows: Formation of Bus Admittance Matrix.	1	19-08 & 15-16 hrs
	Real and reactive power balance equations at a node.	1	20-08 & 14-15 hrs
	Load and Generator Specifications.		
	Application of numerical methods for solution of nonlinear algebraic equations – Gauss Seidel	2	22-08 & 10:11 hrs, 24-08 & 10:11 hrs
	Newton-Raphson methods for the solution of the power flow equations.	2	25-08 & 12-13 hrs, 26-08 & 15-16 hrs
	Computational Issues in Large-scale Power Systems.	1	27-08 & 14-15 hrs
Unit-II: Stability Constraints in synchronous grids	Swing Equations of a synchronous machine connected to an infinite bus. Power angle curve.	2	29-08 & 10-11 hrs, 31-08 & 10-11 hrs
	Description of the phenomena of loss of synchronism in a single-machine infinite bus system following a disturbance like a three-phase fault.	3	01-09 & 12-13 hrs, 02-09 & 15-16 hrs, 03-09 & 14-15 hrs
	Analysis using numerical integration of swing equations (using methods like Forward Euler, Runge-Kutta 4th order methods), as well as the Equal Area Criterion.	3	05-09 & 10-11 hrs, 07-09 & 10-11 hrs, 08-09 & 12-13 hrs
	Impact of stability constraints on Power System Operation.	1	09-09 & 15-16 hrs
	Effect of generation rescheduling and series compensation of transmission lines on stability.	1	10-09 & 14-15 hrs
Sessional-I			
Unit-III: Control of Frequency and Voltage	Introduction to control of frequency and voltage.	2	12-09 & 10-11 hrs,
	Turbines and Speed-Governors, Frequency dependence of loads, Droop Control and Power Sharing.		19-09 & 10-11 hrs
	Automatic Generation Control.	2	21-09 & 10-11 hrs, 22-09 & 12-13 hrs

	Generation and absorption of reactive power by various components of a Power System.	2	23-09 & 15-16 hrs, 24-09 & 14-15 hrs
	Excitation System Control in synchronous generators, Automatic Voltage Regulators.	2	26-09 & 10-11 hrs, 28-09 & 10-11 hrs
	Shunt Compensators, Static VAR compensators and STATCOMs. Tap Changing Transformers.	2	29-09 & 12-13 hrs, 30-09 & 15-16 hrs
	Power flow control using embedded dc links, phase shifters.	2	01-10 & 14-15 hrs, 03-10 & 10-11 hrs
Unit-IV: Monitoring and Control	Overview of Energy Control Centre Functions: SCADA systems.	2	05-10 & 10-11 hrs, 06-10 & 12-13 hrs
	Phasor Measurement Units and Wide-Area Measurement Systems.	2	07-10 & 15-16 hrs, 08-10 & 14-15 hrs
	State-estimation.	1	10-10 & 10-11 hrs,
	System Security Assessment. Normal, Alert, Emergency, Extremis states of a Power System.	3	12-10 & 10-11 hrs, 13-10 & 12-13 hrs, 14-10 & 15-16 hrs
	Contingency Analysis. Preventive Control and Emergency Control.	3	15-10 & 14-15 hrs 19-10 & 10-11 hrs 20-10 & 12-13 hrs
Sessional-II			
Unit-V: Power System Economics and Management	Basic Pricing Principles: Generator Cost Curves, Utility Functions, Power Exchanges, Spot Pricing. Electricity Market Models (Vertically Integrated, Purchasing Agency, Whole-sale competition, Retail Competition), Demand Side-management, Transmission and Distributions charges, Ancillary Services.	7	21-10 & 15-16 hrs 22-10 & 14-15 hrs, 24-10 & 10-11 hrs, 26-10 & 10-11 hrs, 27-10 & 12-13 hrs, 28-10 & 15-16 hrs 29-10 & 14-15 hrs
	Regulatory framework.	2	31-10 & 10-11 hrs 02-11 & 10-11 hrs


(Dr. Pankaj Kumar)
Concerned Faculty