COURSE CODE: **1151EE111**	COURSE TITLE: **POWER SYSTEM OPERATION AND CONTROL**	L	T	P	C
		3	**0**	**0**	**3**

COURSE CATEGORY:

Program Core

PREAMBLE :

This course Power system operation and control to become familiar with the preparatory work necessary for meeting the next day's operation and the various control actions to be implemented on the system to meet the minute-to-minute variation of system load.

PREREQUISITE COURSES:

Power System Analysis

RELATED COURSES:

Protection and Switchgear**.**

COURSE EDUCATIONAL OBJECTIVES :

The objectives of the course are to make the students,

- To get an overview of system operation and control

COURSE OUTCOMES :

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
C01	Understand & model power-frequency dynamics and to design power-frequency controller.	K1
C02	Forecasting of base load and Unit commitment using different methods	K2
C03	Understand & model reactive power-voltage interaction and different methods of control for maintaining voltage profile against varying system load	K2
C04	Understand Economic Dispatch Controller and solution of Coordinate equation by iteration method	K3
C05	Explain generation and absorption of Reactive power and the methods of voltage control	K3

CORRELATION OF COs AND POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H				L	L				L	M	
CO2	L		H		H	L	H			L	M	
CO3			H				M			L		
CO4			M		H		L			H	L	
CO5	H		M		H	M					L	

COURSE CONTENT:

UNIT I	**INTRODUCTION**	**9**

Approach adopted in utilities for providing reliable, quality and economic electric power supply; Necessity for regulation of system frequency and voltage; P - F and Q - V control

structure; recent trends in real time control of power systems.		
UNIT II	**LOAD FORECASTING AND UNIT COMMITMENT**	**9**
Load forecasting, components of system load, classification of base load, forecasting of the base load by method of least square fit; Introduction to unit commitments constraints, unit commitment, unit commitment using priority list method and dynamic programming.		
UNIT III	**REAL POWER CONTROL**	**9**
LOCAL CONTROL: Power control mechanism of individual machine, mathematical model of speed governing mechanism, speed load characteristics of governing mechanism; Regulation of two generators in parallel. SYSTEM CONTROL: Division of power system into control areas, LFC control of a single area; static and dynamic analysis of uncontrolled system; proportional plus integral control of a single area; LFC control, of two area system - uncontrolled case, static and dynamic response; Tie line with frequency bias control of two area.		
UNIT IV	**ECONOMICS DISPATCH**	**9**
Incremental cost curve, co-ordination equations with losses neglected - solution by iteration; co-ordination equations with loss included (No derivation of BMN co-efficient); solution of co-ordination equations using BMN co-efficient by iteration method., Base point and participation factors; Economic dispatch controller added to LFC.		
UNIT V	**PRIORITY POWER CONTROL**	**9**
LOCAL CONTROL: Fundamental characteristics of excitation system; Block diagram model of exciter system SYSTEM CONTROL: Generation and absorption of reactive power, method of voltage control, injection of reactive power, static shunt capacitor/inductor VAR compensator, tap changing transformer.		
		TOTAL: 45 PERIODS
TEXT BOOKS:		
1. Olle I. Elgerad, “Electric Energy System Theory and Introduction”, Tata Mc Graw Hill publishing company, New Delhi, 1983. 2. I.J.Nagrath, D.P.Kothari, "Power System Engineering", Tata Mc Graw Hill publishing company Ltd., 1998. 3. Allen J.Wood, Bruce F. Wollenbarg, “Power Generation, operation and control”, John Wiley and sons, 1984.		
REFERENCE BOOKS:		
1. B.M.Weedy, "Electric Power System", John Wiley & sons, Elsevier publishing company, Amsterdam, 1972. 2. A.K.Mahalanbias, D.P.Kothari & S.I.Ahson, "Computer Aided Power System 3. Analysis and Control" Tata Mc Graw Hill publishing company, New Delhi, 1990. 4. Prabha Kundur “Power System Stability And Control” ,McGraw-Hill Professional (Jan 1994)		