

ANNAI MATHAMMAL SHEELA ENGINEERING COLLEGE
COURSE DELIVERY PLAN

Name of the Department: EEE

Name of the Staff: M.Thangavel, AP/EEE

Sub Code & Name: EE2401 & Power System Operation and Control Year / Sem: IV / VII

UNIT-1 INTRODUCTION

Lect. no	Date Planned	Topics to be covered	Time required (periods)	Teaching Methods	Teaching Aids	Books/Journals Referred
1	22.06.15	System load – variation	1	L	CB	1,2
2	23.06.15	Load characteristics	1	L	CB	1,2
3	24.06.15	Load curves and load-duration curve (daily, weekly and annual)	1	L	CB,PP	1,2
4	24.06.15	Load factor	1	L	CB	1,2
5	25.06.15	Diversity factor	1	L	CB	1,2
6	25.06.15	Importance of load forecasting	1	L	CB	1,2
7	27.06.15	Simple techniques of forecasting	1	L	CB	1,2
8	27.06.15	An overview of power system operation and control	1	L,TT	CB,VF	1,2
9	30.06.15	The role of computers in the implementation. (Qualitative treatment with block diagram)	1	L	CB,PP	1,2

UNIT - II REAL POWER - FREQUENCY CONTROL

Lect. no	Date Planned	Topics to be covered	Time required (periods)	Teaching Methods	Teaching Aids	Books/Journals Referred
1	01.07.15	Basics of speed governing mechanism and modeling	1	L,TT	CB	1,3
2	01.07.15	Speed-load characteristics	1	L	CB	1,3

3	02.07.15	Load sharing between two synchronous machines in parallel	1	L,TT	CB,PP	1,3
4	02.07.15	Control area concept LFC control of a single area system	1	L,TT	CB	1,3
5	04.07.15	Static and dynamic analysis of uncontrolled	1	L,TT	CB,PP	1,3
6	04.07.15	Controlled cases	1	L,TT	CB	1,3
7	07.07.15	Integration of economic dispatch control with LFC	1	L,TT	CB	1,3
8	08.07.15	Two-area system – modeling - static analysis of uncontrolled case	1	L	CB	1,3
9	08.07.15	Tie line with frequency bias control of two-area system - state variable model	1	L,TT	CB	1,3

UNIT - III REACTIVE POWER–VOLTAGE CONTROL

Lect. no	Date Planned	Topics to be covered	Time required (periods)	Teaching Methods	Teaching Aids	Books/Journals Referred
1	09.07.15	Basics of reactive power control	1	L,TT	CB	1,2
2	09.07.15	Excitation systems – modeling. Static and dynamic analysis	1	L	CB	1,2
3	11.07.15	Stability compensation	1	L,TT	CB,PP	1,2
4	11.07.15	Generation and absorption of reactive power	1	L,TT	CB	1,2
5	15.07.15	Relation between voltage, power and reactive power at a node	1	L,TT	CB,PP	1,2
6	16.07.15	Method of voltage control - tap-changing transformer	1	L,TT	CB	1,2

7	16.07.15	System level control using generator voltage magnitude setting	1	L,TT	CB	1,2
8	16.07.15	Tap setting of OLTC transformer	1	L	CB	1,2
9	20.07.15	MVAR injection of switched capacitors to maintain acceptable voltage profile and to minimize transmission loss	1	L	CB	1,2

UNIT - IV UNIT COMMITMENT AND ECONOMIC DISPATCH

Lect. no	Date Planned	Topics to be covered	Time required (periods)	Teaching Methods	Teaching Aids	Books/Journals Referred
1	22.07.15	Statement of economic dispatch problem – cost of generation	1	L	CB	3,5
2	22.07.15	Incremental cost curve co-ordination equations without loss and with loss	1	L	CB	3,5
3	23.07.15	Solution by direct method and λ - iteration method. (No derivation of loss coefficients)	1	L	CB	3,5
4	23.07.15	Statement of Unit Commitment problem	1	L	CB	3,5
5	25.07.15	Constraints; spinning reserve, thermal unit constraints	1	L,TT	CB,PP	3,5
6	25.07.15	Hydro constraints, fuel constraints and other constraints	1	L,TT	CB	3,5
7	28.07.15	Solution methods - Priority-list methods	1	L,TT	CB	3,5
8	29.07.15	Forward dynamic programming approach	1	L,TT	CB	3,5
9	29.07.15	Numerical	1	L,TT	CB	3,5

		problems only in priority-list method using full-load average production cost				
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UNIT – V COMPUTER CONTROL OF POWER SYSTEMS

Lect. no	Date Planned	Topics to be covered	Time required (periods)	Teaching Methods	Teaching Aids	Books/Journals Referred
1	30.07.15	Need of computer control of power systems	1	L	CB	1,6
2,3	30.07.15 & 01.08.15	Concept of energy control centre (or) load dispatch centre and the functions	2	L	CB	1,6
4	01.08.15	system monitoring - data acquisition and control	1	L	CB	1,6
5	04.08.15	System hardware configuration	1	L,TT	CB	1,6
6	05.08.15	SCADA and EMS functions	1	L,TT	CB,PP	1,6
7	05.08.15	Network topology - state estimation - security analysis and control	1	L,TT	CB	1,6
8	06.08.15	Various operating states (Normal, alert, emergency, in-extremis and restorative)	1	L,TT	CB	1,6
9	06.08.15	State transition diagram showing various state transitions and control strategies	1	L,TT	CB	1,6

Teaching Aids : Video Film (VF), Power Point Presentation (PP), Demo (D) , Models (M) , Over Head Project (OHP), Chalk Board (CB).

Teaching Methods: Lecture (L), Group Discussion (GD) , Quiz (Q), Seminar (S), Team Teaching (TT) , Lab Visit (LV) ,Industrial Visit.

TEXT BOOKS:

1. Allen. J. Wood and Bruce F. Wollenberg, 'Power Generation, Operation and Control', John Wiley & Sons, Inc., 2003.

2. Chakrabarti & Halder, “Power System Analysis: Operation and Control”, Prentice Hall of India, 2004 Edition.

REFERENCES:

3. D.P. Kothari and I.J. Nagrath, ‘Modern Power System Analysis’, Third Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2003. (For Chapters 1, 2 & 3)
4. L.L. Grigsby, ‘The Electric Power Engineering, Hand Book’, CRC Press & IEEE Press, 2001.
5. Hadi Saadat, “Power System Analysis”, (For the chapters 1, 2, 3 and 4) 11th Reprint 2007.
6. P.Kundur, ‘Power System Stability and Control’ MC Craw Hill Publisher, USA, 1994.
7. Olle.I.Elgerd, ‘Electric Energy Systems theory An introduction’ Tata McGraw Hill Publishing Company Ltd. New Delhi, Second Edition 2003.