

# AMEE27 POWER SYSTEM OPERATION AND CONTROL

## UNIT-1 INTRODUCTION

- 1.1 Structure of power systems,
- 1.2 Power system control center and real time computer control,
- 1.3 SCADA system Level decomposition in power system Power system security various operational stages of power system Power system voltage stability

## UNIT-2 ECONOMIC OPERATION

- 2.1 Concept and problems of unit commitment Input-output
- 2.2 Characteristics of thermal and hydro-plants system constraints
- 2.3 Optimal operation of thermal units without and with transmission losses,
- 2.4 Penalty factor, incremental transmission loss, transmission loss formula (without derivation)
- 2.5 Hydrothermal scheduling long and short terms Concept of optimal power flow

## UNIT-3 LOAD FREQUENCY CONTROL

- 3.1 Concept of load frequency control,
- 3.2 Load frequency control of single area system:
- 3.3 Turbine speed governing system and modeling, block diagram representation of single area system, steady state analysis, dynamic response, control area concept,
- 3.4 P-I control, load frequency control and economic dispatch control.
- 3.5 Load frequency control of two area system:
- 3.6 Tie line power modeling, block diagram representation of two area system,
- 3.7 Static and dynamic response

## UNIT-4 AUTOMATIC VOLTAGE CONTROL

- 4.1 Schematic diagram and block diagram representation,
- 4.2 Different types of Excitation systems & their controllers.
- 4.3 Voltage and Reactive Power control: Concept of voltage control,
- 4.4 Methods of voltage control-control by tap changing transformer.
- 4.5 Shunt Compensation, series compensation, phase angle compensation

## UNIT-5 STATE ESTIMATION

- 5.1 Detection and identification, Linear and non-linear models.
- 5.2 Flexible AC Transmission Systems: Concept and objectives FACTs controllers:
- 5.3 Structures & Characteristics of following FACTs Controllers.
- 5.4 TCR,FC-TCR, TSC, SVC, STATCOM, TSSC, TCSC, SSSC, TC-PAR, UPFC

## Reference Books:

1. O.I. Elgerd, "Electric Energy System Theory" Tata McGraw Hill.
2. P. Kundur, "Power System Stability and Control McGraw Hill.
3. M.H. Rashid, "Power Electronics: Circuits, devices and Applications" Prentice Hall of India,3rd Edition.