

4/4 B.Tech. SECOND SEMESTER

EE8T3A POWER SYSTEM DYNAMICS & STABILITY (Elective –III) Credits: 4

Lecture: 4 periods/week
Tutorial: 1 period /week

Internal assessment: 30 marks
Semester end examination: 70 marks

Objectives:

To study the modeling of synchronous machine, stability analysis, multi machine stability and different excitation system

Learning outcomes:

After completing the course student Understand the system dynamics, stability, stability limits, digital simulation of transient stability , multimachine stability and excitation system in power system

Unit I

System Dynamics : Synchronous machine model in state space form , computer representation for excitation and governor systems –modelling of loads and induction machines.

Unit II

Stability – steady state stability limit – Dynamic Stability limit – Dynamic stability analysis.

Unit III

State space representation of synchronous machine connected to infinite bus, Time response – Stability by eigen value approach.

Unit IV

Digital Simulation of Transient Stability : Swing equation, Machine equations

Unit V

Concept of Multimachine Stability, Multimachine Transient Stability Under Different Faulted Conditions.

Unit VI

Effect of governor action and exciter on power system stability. Effect of saturation, saliency & automatic voltage regulators on stability.

Unit VII

Excitation Systems : Rotating Self-excited Exciter with direct acting Rheostatic type, voltage regulator – Rotating main and Pilot Exciters with Indirect Acting Rheostatic Type Voltage Regulator.

Unit VIII

Rotating Main Exciter, Rotating Amplifier and Static Voltage Regulator – Static excitation scheme – Brushless excitation system.

Learning resources

Text books:

1. Power System control and stability by Anderson and Fund, Vol – I, P.M.Arolerson & A.A.fouad, Galgotia Publications 3B/12, Uttari marg Rajunder Nagar, New Delhi – 110060, 1981, 1 st edition.

2. Power System Dynamics Stability and Control by K.R.Padiyar, Second edition B.S.Publications 2002.
3. Power System Analysis by “Hadi Saadat” – Tata McGraw Hill Publications

Reference books:

1. Power System Stability by Kimbark Vol. I&II, III – 1968, Dover Publication Inc, New York 1968.
2. Computer Applications to Power Systems–Glenn.W.Stagg & Ahmed. H.El.Abiad
3. Power Systems Analysis & Stability – S.S.Vadhera Khanna Publishers.
4. Power System Analysis by John J.Graniger William D.Stevenson. JR. – Tata McGraw Hill Publications.