

****Disclaimer****

This syllabus is to be used as a guideline only. The information provided is a summary of topics to be covered in the class. Information contained in this document such as assignments, grading scales, due dates, office hours, required books and materials may be from a previous semester and are subject to change. Please refer to your instructor for the most recent version of the syllabus.

EEE 575
Power System Stability

Text Book – Power System Control and Stability, P.M. Anderson and A.A. Fouad, 2nd Edition, IEEE Press, Wiley Interscience ISBN 0-471-23862-7

Topics

1. Introduction
 - Basic Concepts
 - System Dynamic Performance
 - Criteria for system dynamic performance
 - Types of stability studies
 - Conditions in the North American interconnection

2. The Classical Model
 - The Swing Equation
 - Synchronizing power and natural frequencies of oscillations
 - The equal area criterion
 - Multimachine stability studies
 - Digital simulation of multimachine systems

3. Response of a Power Network to Small Disturbances
 - The small signal stability problem
 - Tie-line oscillations
 - Modes of oscillation
 - Analytical basis for identifying modes

4. The Synchronous Machine
 - The two reaction theory
 - Development of the complete d and q - axes equations in per unit
 - Formulation of the state-space equations
 - Equations of the one machine connected to infinite bus
 - Transient and subtransient parameters
 - Simplified models
 - Synchronous machine simulation
 - Steady-state conditions and phasor diagrams

5. Simulation of Multimachine Systems
 - Reference Frames
 - Synchronous Machine Controls
 - Load Modeling
 - Saturation

6. Conducting time domain simulations and special studies
 - Types of studies
 - Determining level of modeling detail

- Data collection
- Details of running studies
- Analysis of results