

Course Syllabus

Course No. & Title: Power System Analysis II

Term & Meeting Info: Spring 2017, Monday and Wednesday 12:30 to 1:45 pm, ENC 1002

Instructor Info: Dr. Lingling Fan linglingfan@usf.edu Fax: 974-5250
Office: ENB 247; Phone: 974-2031 (Office)
Office hours: after the class sessions or by appointment

Catalog Description: Power system control and stability will be covered in this course. The two main controls in power system are voltage control and frequency control. The mechanism of the two types of control & power system stability will be examined. This is a graduate course, also suitable as a senior level undergraduate elective. Students will learn theory as well as simulation tools.

Semesters Offered: Usually once every year.

Prerequisites: Circuits and Control Systems, Power System Analysis or graduate standing

Level: UG/Grad **Credits:** 3 **Class Duration:** 75 minutes each class

Text Info: **L. Fan, Power Systems II class notes.** The packet can be purchase from Pro-copy (5219 E. Fowler Ave. Tampa, FL 33617, next door of Publix) v

Reference: **A.R. Bergen, Power System Analysis (ver 2), Prentice Hall.**

Test & Grading Info: Attendance & homework assignments 40%
Midterm exam: 30%
Final exam: 30%

All grades are averaged and the final grade is determined by the following scale: A=100-90, B=89-80, and so forth.

Course Topics:

1. Review of Calculus and Laplace transformation
First-order, second-order single variable differential equation solving
Numerical integration through coding or Matlab/Simulink
Matlab Control Toolbox tutorial
2. Frequency Control
Plant model for frequency control; Primary frequency control; Secondary frequency control;
Automatic Generation control
3. Generator Modeling
Steady-state model, phasor diagram, power relationship; Park's transformation; Six-order $0dq$ electric part model; Mechanical equation; Simplified model; Applications: voltage buildup, short circuit, stability
4. Voltage Control
Plant models for voltage control: no electromagnetic dynamic, rotor flux decay model; Automatic voltage control; Power system stabilizer
5. Power System Large-Signal Stability
Swing equation; Equal-area criterion; Dynamic simulations; Methods to improve stability

Emergency Preparedness for Academic Continuity:

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

Students with Disabilities:

Students in need of academic accommodations for a disability may consult with the office of Students with Disabilities Services to arrange appropriate accommodations. Students are required to give reasonable notice prior to requesting an accommodation.”

Additional Course Features: The fundamentals of large scale power systems analysis is stressed, so that the student can then be prepared to further investigate a topic and share the results of their investigations with the rest of the class. The intent is to begin to train the student in becoming an independent researcher and/or productive member of an industrial or academic team. The course is taught by an interactive discourse between the instructor and student, and students with students.

Academic Integrity

The faculty of the Electrical Engineering Department is committed to maintaining a learning environment which promotes academic integrity and the professional obligations recognized in the IEEE Code of Ethics (<http://ee.eng.usf.edu/about/codeOfEthics.htm>). Accordingly, the department adheres to a common Academic Integrity Policy in all of its courses. This policy is to be applied uniformly in a fair and unbiased manner.

University rules regarding academic integrity will be strictly enforced. It is not acceptable to copy, plagiarize or otherwise make use of the work of others in completing homework, project, laboratory report, exam or other course assignments. Likewise, it is not acceptable to knowingly facilitate the copying or plagiarizing of one's own work by others in completing homework, project, laboratory report, exam or other course assignments. It is only acceptable to give or receive assistance from others when expressly permitted by the instructor. Unless specified otherwise, as in the case of all take-home exams, scholarly exchange regarding out-of-class assignments is encouraged. A more complete explanation of behaviors that violate academic integrity is provided at:

<http://www.ugs.usf.edu/catalogs/1112/pdf/AcademicIntegrityOfStudents.pdf>.

The minimum penalty for violation of the academic integrity policy stated in the preceding paragraph is the greater of an automatic zero on the assignment or a letter grade reduction in the overall course grade. Student(s) found in violation of the policy on an exam will receive a minimum penalty of an F in the course. All instances of policy violations will be recorded in a letter from the instructor that is kept in the student files held by the department; a copy of the letter will be forwarded to the appropriate (undergraduate or graduate) Dean's office. A second violation of the policy, irrespective of whether it was related to an exam or any other course assignment, will result in a course grade of “FF” and expulsion from the Electrical Engineering Department.

At the instructor's discretion the penalties associated with the EE Department's Academic Integrity Policy may be stricter, in which case further explanation is provided in the following.

Modifications to the Uniform Academic Policy: <none>

Additional Course Info: none

Syllabus Prepared by: Dr. Lingling Fan