

EEL 6273 - POWER SYSTEM STABILITY AND CONTROL
Course Syllabus and Information
Spring Semester 2025

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Course Website: <http://www.aln.fiu.edu/EEL6273>

Class Time and Office Hours:

Thursdays 5:00-7:40 PM, Office Hours Thursdays 4:00-5:00 PM

Prerequisite: EEL 4215 or permission of Instructor

Text and notes and Software:

1. Lecture notes by Prof. Mohammed and other demonstration material and examples will be available to students and on the above website.
2. Power Systems Stability and Control, Edited by Leonard L. Grigsby, CRC Press, Second Edition 2007. This book will be used as a reference book.
3. A Free Software package will be made available to students.

Laboratory Facilities: Demonstrations will be conducted on various topics at the Smart Grid Testbed.

Course Topics: This advanced power systems analysis course will include the following topics:

- Alternate Energy Grid Integration Issues (Energy Storage including Electric/plug-in-hybrid vehicles, solar resources, photovoltaic materials and systems, wind energy, fuel cells, and biofuels)
- Distributed Generation Technologies and the Economics of Distributed Resources in power system stability and control.
- Introduction to Phasor measurements and Smart Grid Integration Issues (this topic will involve generator protection and monitoring, wide area protection control and monitoring, power system communications, information processing, information security, protection system reliability and testing, substation protection control, and monitoring system design and there will be an introduction to FERC regulatory overview)
- Formulation of the power system stability problem (Generator models for system stability, Transient Stability and Dynamic operation, Stability Criteria)
- Longer-term stability and static and dynamic security assessments
- Introduction to Power systems controls, multi-area control, and automatic generation control.
- Case studies and applications

Course Objectives:

1. Introducing students to practical alternate Energy grid integration issues
2. Introduce students to the distributed generation technologies and their impacts on power system stability and control.
3. Introduction to new technologies of Phasor measurements and smart grid integration issues
4. Discuss methods for power system stability and control

5. Identify component models for system stability and study transient stability issues and their solution techniques
6. Formulate the transient stability for large-scale systems and study power system control and multi-area control
7. Involve students in practical power systems stability and control through the term project.

Who Should Take This Course?

1. FIU Electrical and Computer Engineering Graduate Students
2. Students at other Universities in Florida or out of State.
3. Engineers and technical personnel in Industry preparing for an Engineering License.
4. Engineers and technical staff who want to keep current and reach a deep understanding of power system analysis and design concepts.
5. Electric Utility managers and supervisors are looking for continued training.
6. Engineering contractors and consultants for familiarity with electric utility operations.

Assistance: Please try to see Dr. Mohammed during his listed office hours or through the communication forum on the web page. If this proves impossible, a personal appointment should be arranged by calling the above phone number or the ECE department secretary at extension (305-348-2807).

Absence: Class attendance is very important and is considered in your overall performance in the course. Students are responsible for all material covered in that class.

IMPORTANT RULE: Students are encouraged to discuss the course topics with the professor and each other. Any work submitted (Homework, Tests, projects, etc.) should be pledged and signed as the student's own work, and that there is no unauthorized help was obtained. Violators will be subject to academic misconduct, which might lead to dismissal from the university.

Grading Policy: All tests and final exams will be identified as open or closed books/notes. Homework will be assigned regularly, collected, and graded. Efforts in homework indicate that you are studying and caring about the course and, therefore, can greatly impact your final grade. The mid-term time will be announced one week in advance. Any work submitted must be neat and detailed for partial marks. Preferably, your take-home assignments and projects should be typed. Computer simulation assignments should be treated as detailed engineering reports with discussion of results. Your final grade will be calculated as follows:

Homework & Class assignments	20%
Mid-term	25%
Projects	25%
Final Exam	30%
Total	100%

Class and Term Project:

A good practical experience. During the semester, you will be assigned projects. All projects will be individually assigned to students and will involve simulation, analysis, design, and discussion of sample power systems involving power system operation, stability, and control. Demonstration projects will require research and analysis by the students. Formal presentations will be identified and require professional execution to show students' understanding. A final presentation (oral and written) of the overall final project results will be required. Students are encouraged to discuss their projects with the instructor.