

EE491 Performance of Power Systems
Fall 2020 Course Syllabus
Tuesdays and Thursdays 9.10 am to 10.25 am on Zoom

Instructor: Dr. Mani V. Venkatasubramanian
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Course website: WSU blackboard (learn.wsu.edu)
Office hour: Wednesdays 9 to 10 am

Teaching Assistant: Ali Shakeri Kahnouei
Office: Online (please email Ali with questions)
Homeworks review session: Tuesdays 530 to 630 pm
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Course Text-book: Power System Analysis
Authors: J.J. Grainger and W.D. Stevenson Jr.
Publisher: McGraw Hill Inc.
ISBN: 0-07-061293-5

Specific goals for the course:

At the end of this course, students must be able to:

- Carry out power-flow analysis of small-scale static power system models
- Apply concepts of economics for generation cost minimization in simple power system models
- Apply concepts of small-signal stability analysis and transient stability analysis of small-scale power system models

Course topics:

1. Power System components (Weeks 1-2):
 - a. Brief review of EE361: AC power concepts, Transmission line models.
2. Power-flow Analysis (Weeks 3-8):
 - a. Power-flow equations
 - b. Solution methods: Newton-Raphson, Fast decoupled, DC power-flow.
 - c. State estimation
3. Economic Operation (Weeks 9-10)
 - a. Classical economic dispatch
 - b. Other topics: Optimal power-flow problem.
4. Stability concepts (Weeks 11 onwards)
 - a. Dynamic models of synchronous machines
 - b. Stability concepts and analysis
 - c. Automatic Generation Control

Course Evaluation:

Homework: 10% (due on Thursdays)
Midterm 1: 25% (October 1st)
Midterm 2: 25% (November 12th)

Matlab Project 1: 5% (Power-flow)

Matlab Project 2: 5% (Stability)

Comprehensive Final Exam: 30% (December 15th 7 am to 10 am)

Homeworks policy:

Failure to submit three or more homework assignments will result in loss of one letter grade.

Attendance policy:

Attendance of lectures and participation in class discussions are important for effective learning of the course material. Regular class attendance is expected. For genuine reasons, absence in lectures may be excused subject to prior approval from the instructor. If you are unable to attend the online lectures on a regular basis because of time zone issues, please coordinate with the instructor.

Students with Disabilities:

Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

WSU Safety Information:

Instructor will review WSU safety related sites noted below and discuss classroom emergency plan with students:

<http://safetyplan.wsu.edu>

<http://alert.wsu.edu>

<http://oem.wsu.edu/emergencies>

Academic Integrity Policy:

The course will adhere to EECS academic integrity policy listed at <http://www.eecs.wsu.edu/~schneidj/Misc/academic-integrity.html> and WSU academic integrity policies listed at <http://www.conduct.wsu.edu/default.asp?PageID=343>
<http://www.wsulibs.wsu.edu/plagiarism/main.html>

Please note the following additional guidelines considering the online instruction platform and violation of these policies will result in a Fail grade in the course:

- 1) Homework assignments are intended as essential components of learning the course outcomes. Accordingly, getting external help (outside of your class peers at WSU, course TA and instructor) is not allowed.
- 2) Midterm and final exams will be proctored by the course instructor and TA or by other support staff as decided by WSU. In case of any questions or clarifications, please consult with the proctoring personnel during the exams. Any consultation with anyone or any website outside of the proctoring personnel during the exams is strictly not allowed.

- 3) The two Matlab projects in the course are assigned as take-home exams. They are to be solved by each student individually. Please contact the course instructor with any questions. Consultation with anyone excepting the course instructor is strictly not allowed.