

Western Washington University
Engineering and Design Department,
Spring 2017
Professor Xichen (She-Chen) Jiang (ET 268)
Class: ET 322, M W F 2:00-3:00
Lab: ET 328, Th 12:00-2:00
Office Hours: **ET 328**, M 2:00-3:00, F 2:00-3:00, and by appointment/ “open-door”



EE 378: Smart and Renewable Power

Course Outline

Module 1: Renewable and Distributed Generation

- Distributed Generation Concept and Definition
- Wind power
- PV power
- Fuel Cell Power, Micro-turbine power and Energy Storage
- Renewable Energy intermittency in power system operation
- The different type of renewables available in each country. What are the challenges that the countries face?

Module 2: Power Systems Operation

- Load, transmission and generation
- Power flow analysis
- Unbalanced power System Analysis
- Fault Analysis
- Economic dispatch and unit commitment
- Energy and reserve markets
- Discuss how different power systems in different countries serve their specific needs.

Module 3: Smart Grid

- Definition and evolution
- Objectives, main features and Applications
- Demand Response and Smart Grid monitoring
- Plug-In Electric Vehicle
- How do other countries feel about implementation of the smart grid (i.e., from economic, policy, and technology standpoint)?

References

- 1) Ali Keyhani, Design of Smart Power Grid Renewable Energy Systems, Willey ISBN: 978-0-470-62761-7
- 2) Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, Smart Grid: Technology and Applications, Willey, ISBN: 978-0-470-97409-4
- 3) Classroom notes.

Required Component and Evaluation

Laboratory		20%								
Midterm 1		20%								
Midterm 2		20%								
Home work		10%								
Final Exam		30%								
Quizzes		Extra Credit								
Marks (total 100)	>=90	85-89	80-84	75-79	70-74	65-69	60-64	55-59	50-55	<50
Grade	A	A-	B+	B	B-	C+	C	C-	D	F

*Students must earn at least 40% on the final exam to pass the course

- **Reading Assignments:** Book chapters corresponding to lectures.
- **Quizzes:** Occasional “extra-credit” quizzes (will be announced). Closed book and notes. Calculators allowed.
- **Exams:** Closed book midterms and final. One sheet of notes allowed for Midterm 1. Two sheets of notes allowed for Midterm 2. Three sheets of notes allowed for final. Calculators allowed. **FINAL EXAM is on .**
- **Homework:** Problems will be assigned on Wednesday and will be due the following Wednesday (before lecture). Please use WHITE PRINTER PAPER (may be obtained from me). Lowest grade on homework is dropped.
- **Labs:** Done in groups of two and there will be lab reports. Useful software: XCircuit, Inkscape.
- **Name Tags:** Please bring them to class.
- **“Curve”:** May be applied at the END of quarter depending on circumstances.

Student Responsibility:

- Students are expected to know what constitutes academic integrity to avoid committing academic offences and to take responsibility for their actions.
- Students who are unsure whether an action constitutes an offence, or who need help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, or academic advisor.
- For information on University Academic dishonesty rules and policy, refer to Appendix D in Western's Bulletin.
- Cheating and/or plagiarism may result in an "F" grade in the course.

Specific student responsibilities for EE-378 are:

- Your behavior must be respectful and professional in the lectures and Labs.
- In the lab you must prepare, perform, and document laboratory experiments as your own original work. This means you must not copy the prelab, measured data, or write-up from other students (including old labs). Discussion between students is allowed, but copying is prohibited.
- You are responsible for knowing the course schedule, and must monitor Canvas for changes to the schedule and general announcements.
- You are responsible for informing your instructor when you miss a lab or exam due to extenuating circumstances. Documentation verifying the severity of the situation (e.g., medical note stating student is unable to attend an exam due to a severe illness) will be required to provide accommodations.

Attendance Policy:

- Students are expected to attend all lectures and labs.
- Students must take the midterm and the final exam to pass the course.

Student Outcomes:

- Learn the technical contents of the course as it pertains to power systems analysis
- Be able to understand issues surrounding the current power grid and the challenges that exist both in research and in industry
- Be more aware of the global role in which power systems in different countries have evolved and the policies that have shape their development

Special accommodations:

Note for students with Disability: Students may contact the disability resources office at 650-3083 for accommodation if there is need.