



The University of Texas at El Paso
Department of Electrical and Computer Engineering
EE 4395/5390 - Special Topics in Electrical Engr:
Flexible Power Transmission Systems
Spring 2021 Tuesday and Thursday 4:30-5:50 PM Online

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Office Hours: by appointment

Course Description: National Academy of Engineering refers to the North American electric power grid as the largest and most complex machines that has ever been built. Interconnectivity of this system is the main source of complexity, connecting a large geographical area through over 200,000 miles of high voltage transmission lines. This course focuses on the transmission network, physics of power flow, as well as economic implications of transmission congestion. Mathematical modeling of the transmission system is at the heart of this course. Since power system operation is an optimization problem, basics of linear programming will also be reviewed. After taking this class, students should have a good understanding of how the transmission network is modeled in power system operation tools, how congestion is created, and what the economic implications of transmission bottlenecks are.

Textbook: There is no required textbook for this course. I will upload all class notes to Blackboard and everything will be covered in the class notes. The following book can be used as a reference for part of the course material: *Allen Wood, Bruce Wollenberg, and Gerald Sheblé, "Power Generation, Operation, and Control," 3rd Edition, New York: Wiley, 2013.*

Topics to be Covered (Tentative):

1. Basics of power system
2. A review of microeconomics and electricity market
3. Linear optimization
4. Physics of power flow
5. Optimal power flow
6. Optimal transmission switching
7. The optimal application of flexible AC transmission systems (FACTS) in power systems

Grading Policy:

90 – 100	A
80 – 89	B
70 – 79	C
60 – 70	D
< 60	F



For EE 4395:

Homework	31% (Late submissions will not be accepted; the lowest score will be dropped.)
Three Exams	20% each
Attendance	9% (each unexcused absence takes 3%; three unexcused absences will result in a 0 in the attendance score.)
Final Project (optional)	a bonus of up to 20%

For EE 5390:

Homework	20% (Late submissions will not be accepted; the lowest score will be dropped.)
Three Exams	17% each
Final Project	20% (there will be a bonus of up to 10% if the final paper is submitted to a conference or journal.)
Attendance	9% (each unexcused absence takes 3%; three unexcused absences will result in a 0 in the attendance score.)

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