



The University of Texas at El Paso
Department of Electrical and Computer Engineering
EE 4395/5390 - Special Topics in Electrical Engr:
Transmission Power Flow Control
Spring 2022 Monday and Wednesday 6:00-7:20 PM

Instructor: Yuanrui Sang

Email: ysang@utep.edu

Phone: (915) 747-6632

Office: Engineering Building, Room A-334

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. Programming skills that are needed for this course
4. Linear optimization
5. Physics of power flow
6. Optimal power flow

Grading Policy:

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

For EE 4395:



Homework	30% (Late submissions will not be accepted; the lowest score will be dropped.)
Two Exams	30% each
Attendance	10% (each unexcused absence takes 3%)
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.)
Two Exams	25% 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	10% (each unexcused absence takes 3%.)

Policy on Scholastic Dishonesty: Students are expected to be above reproach in all scholastic activities. Students who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. Scholastic dishonesty includes but is not limited to reproducing test or quiz materials from memory, copy/paste or Xerox, cheating, plagiarism, collusion, the submission for credit or any work or materials that are attributable in whole or in part to another person, taking an examination for another person, and any act designed to give unfair advantage to a student or the attempt to commit such acts. Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22. See detailed procedure in the Handbook of Operating Procedures (HOP) available in the Office of the Dean of Students.

Policy on Accommodations: If you have a condition, which may affect your ability to perform successfully in this course, you are encouraged to discuss this in confidence with the instructor and/or the director of the Disabled Student Services. Written guidelines r/t accommodations from The Center for Accommodations and Support Services (CASS) must be submitted to the course manager in two weeks after the start of the course. If you have a disability and need classroom accommodations, please contact CASS at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass. *CASS' Staff are the only individuals who can validate and if need be, authorize accommodations for students with disabilities.*

Copyright Notice: Copyright law protects many of the materials that are posted within this course. These materials are only for the use of students enrolled in this course and only for the purpose of this course. They may not be further retained or disseminated.

COVID-19 Precautions

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso



area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.