

EC417 -- Electric Energy, Adapting to Renewable Resources Fall 2022

Topics:

- Brief History of Power Systems (the great AC-DC battle)
- AC circuit analysis
- Analysis methods for 3-phase systems
- Basic Components of Power Systems (generation, transmission, distribution -- electric motors and other loads)
- Power Plants with emphasis on renewables (solar, wind, fuel cells, biomass)
- Real and Reactive Power and Power Factor calculations
- Transformers
- Introduction to Power Electronics and AC/DC and DC/ AC converters with application to high voltage circuits
- The Power Grid and the topology of Power systems
- Power system simulation methodologies (POWER WORLD)
- Methods for monitoring, control, and optimization of Power Systems including issues related to stability and "blackouts" (especially those related to the introduction of renewables (Photovoltaics, wind, etc.)
- Development of the "Smart Grid"
- Electric Vehicles
- A whole new set of problems with the future introduction of PHEVs (Plug-In Hybrid Electric Vehicles) and EVs along with issues related to their "charging stations").
- Future directions and the resulting impact on the current electric utility industry which will be greatly impacted by new developments in storage technology, HVDC, electric transportation, etc.

Text:

El-Sharkawi, Electric Energy - An Introduction (Third Edition) , CRC Press, 2012

Grading Policy:

Midterm	30%
Final	45%
Homework / Short Papers	20%
Attendance	5%

Instructor:

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Announcements / Uploading all assignments: Blackboard Learn

Academic Misconduct

BU takes academic integrity very seriously. Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments, or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own. More information on BU's Academic Conduct Code, with examples, may be found at

<http://www.bu.edu/academics/policies/academic-conduct-code> .

Collaboration Policy

Homework, essays (and other assignments as specifically so mentioned) must be your own work.

Essays must have properly quoted references. No specific format (or template) is required in this course.

You must write all answers in your own words (obvious copy from solutions manuals – or other sources - will get zero).

You must be able to fully explain your answers upon demand.

You may not collaborate with anyone on exams.

Class Material

All class material (handouts, exams, exam solutions, etc) may not be copied, posted on any web-site, or otherwise be made available to others.

Failure to meet any of the above constitute plagiarism and will be considered cheating in this class. If you are not sure whether something is permitted by the course policy, ASK ME! (it's much more awkward to explain your actions after the fact to the college disciplinary committee).