

Spring 2024

ECE 442-002: Power Systems

Walid Hubbi

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Recommended Citation

Hubbi, Walid, "ECE 442-002: Power Systems" (2024). *Electrical and Computer Engineering Syllabi*. 88.
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Course number and name	ECE 442, Power System Analysis
Credits, contact hours	3 credits, 3 contact hours
Name of instructor	Walid Hubbi
Instructional Materials	Power System Analysis and Design, 7th ed., Glover, Sarma, Overbye, and Birchfield.

Specific course information

brief description of the content of the course (catalog description)

Course Catalog Description: Introduction to power plants and power networks. Topics include transmission line parameters, system modeling, economic operations of power systems, load flow studies, short circuit analysis, and power system stability

prerequisites ECE 341/ECE 342

Educational objectives for the course :

Students will be able to:

1. Acquire understanding of the importance of power systems to society and civilization.
2. Learn how to calculate real power, reactive power, and understand phasor domain.
3. Learn how to obtain a model of a power system and its components.
4. Learn how to calculate system response to static boundary conditions—load flow.
5. Learn how to schedule generation economically.
6. Learn how to calculate the system response under faulty conditions.
7. Learn some aspects of power systems control.

Brief list of topics to be covered

- Introduction, Power Systems Operational Problems, Review of circuit theory, phasors, complex power
- Transformers, per unit system.
- R and L parameters of single-phase transmission lines.
- Capacitance of T-Lines
- Medium and short line representation, network equations
- Power flow techniques – solving by the Gauss-Seidel method
- Power flow techniques – Solving by the Newton-Raphson method
- Economic Dispatch
- Symmetrical Faults
- Power Systems Controls

