

ECE 418 – POWER SYSTEM ANALYSIS AND DESIGN

Type (check one): Required: _____ Elective: X

2005-2006 Catalog Data: ECE 418. Power System Analysis. (Formerly EE 418) A study of power system parameters, circuit transposition and per unit computation. Load flow studies. Fault calculations by computer simulation. System stability and protective relaying. Circuit breakers and lightning arresters. Formal reports required for two design projects. Prerequisites: ECE 222 and ECE 401, or permission of the instructor. Offered in the Spring semester. *One semester; three credits.*

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Co-Requisites: None

Textbook: Glover, J. D. and Sarma, M. S., (2002). *Power System Analysis and Design*, (3rd Edition), Brooks/Cole: Pacific Grove, CA, ISBN: 0-534-95367-0.

Other Required Materials: None

Other References: None

Instructor: Dr. Fred H. Terry, Professor of Electrical and Computer Engineering

Course Objectives:

1. Basic competence in solving problems in electric power generation, distribution and utilization.
2. Introduction to power system organization and operation
3. Use of fundamental concepts from electric circuits and power utilization
4. Use of engineering software such as PSPICE and MathCAD[®] to supplement more traditional methods of problem solving
5. Design of power systems including realistic constraints such as safety and economic considerations

Prerequisites by Topics:

1. Steady-state AC and transient analysis of linear circuits.
2. Analysis of balanced and unbalanced three-phase circuits.
3. Analysis of single phase and multiphase transformers; general, linear, or ideal.
4. Modeling of electrical systems.

Topics:

1. Circuit fundamentals
2. Power transformers
3. Transmission line parameters
4. Steady state operation of transmission lines
5. Power flows
6. Symmetrical faults
7. Symmetrical components
8. Unsymmetrical faults
9. System protection
10. Power system design and control

Class Schedule: Two 75-minute sessions per week

Prepared by: Dr. Fred H. Terry **Date:** August 2005

**Professional Component:
ECE 418 – POWER SYSTEM ANALYSIS AND DESIGN**

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input type="checkbox"/> Significant <input checked="" type="checkbox"/> Some <input type="checkbox"/> None
Realistic Constraints (check all that apply)	<input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input checked="" type="checkbox"/> Health & Safety <input checked="" type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice