ECE 4113 - Electrical Power Systems  
Spring 1999

1997-1999 Catalog Data:  
ECE 4113: Electrical Power Systems.  Prerequisite: ECE 3113, ECE 3713.  
Transmission and distribution of electrical energy.  System load flow and 
control.  Faults and system transients.  (F)

Prerequisites:  
ECE 3113, ECE 3713.

Textbook:  

References:  
None.

Course Objectives:  
To acquaint students with basic concepts of power system design and operation 
and familiarize students with power system components.  Balanced steady state 
operation is emphasized.

Coordinator:  
Fred N. Lee, Professor, School of Electrical and Computer Engineering.

Prerequisites by Topic:  
AC circuit analysis; Basic electromagnetic energy conversion; Electromagnetic 
field theory.

Topics:
1. Review of basic concepts: Phasors, impedance, power in single phase ac circuits, complex power and the 
power triangle, direction of power flow; voltage, current, and power in balanced 3-phase circuits.
2. Symmetrical components.
3. Analysis in the positive sequence “phase”.  The per unit system.
4. System modeling: Construction, excitation, and circuit models of synchronous machines, transformers and 
their symmetrical component models, per unit impedances, one-line diagrams, impedance and reactance 
diagrams.
5. The power flow problem.  Formulation and the Newton-Raphson solution method.

Schedule:  
Lecture - 3 hrs.  (Class meets twice/week).

Computer Usage:  
Use computer to solve assigned problems.

Design Projects:

Laboratory Projects:

Written and/or Oral Communications:

Teamwork:

Assessment Methods Used:
1.  Standard course evaluation.

Contribution to Professional Component:  
Engineering Science - 2 credit hours or 67%  
Engineering Design - 1 credit hour or 33%

ECE 4113 - Electrical Power Systems (continued)
Program Objectives: Related Strategy and Actions:
2i, 2iii, 3ii

ABET 2000 Criterion 3 Contents:
a,b,c,e,i,k

Prepared by: Fred N. Lee
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