The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 4319 –Power Systems Analysis and Design (Elective)

Syllabus

Catalog Description:

Transmission line modeling; transformer modeling; the per unit system; generator modeling; power flow analysis; economic operation of power system; power system stability; symmetrical components; fault analysis and sequence networks; power system protection.

Prerequisites: EENG 4310

Credits: 3 (3 hours lecture, 0 hours laboratory per week)

Text(s): No textbook required

Additional Material: Instructor's Lecture Notes, assigned readings

Course Coordinator: Hassan El-Kishky

Topics Covered: (paragraph of topics separated by semicolons)

Introduction to power systems
Transmission Lines Parameters
Power Transmission Line Models
Three-phase transformers
Synchronous Machine Models
Load Flow Analysis using Newton-Raphson
Symmetrical Components
Fault Analysis
Power System Steady-State and Transient Stability
Design of overhead power distribution lines

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives[1]: By the end of this course students will be able to:

1. Solve 3-phase circuits for current, voltage, and power [1]
2. Determine power transmission line R, L, and C parameters [1,4]
3. Analyze and characterize power TL models [1,4]
4. Develop and characterize generator, transformer, and load models [1,4]
5. Develop and Solve the power flow using the Newton-Raphson method [1,4,5]

6. Develop symmetrical and unsymmetrical fault models in power system [1,4]
7. Solve symmetrical and unsymmetrical fault problems in power systems [1,4,5]
8. Solve simple transient stability problems in power system [1]
9. Solve simple protection problems in power systems [1]
10. Apply codes, standards, and best engineering practice [3,5,6]
11. Design a 3-phase high voltage overhead power distribution line [3,4,5,6]
12. Write and present a design report [12]

[1]*Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. [1-9]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. [11]
3. an ability to communicate effectively with a range of audiences [12]
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. [10]
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. [12]
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions [1-8]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [10]

[2]*Numbers in brackets refer to course objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	3	hours
General Education Component:	0	hours

Prepared By: Hassan El-Kishky Date: 01/07/2013

Revised 01/25/13
01/10/14
01/04/15
01/11/18
01/03/22