

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: Dr. Reem Salim

Topics Covered: (paragraph of topics separated by semicolons)

Introduction to power systems  
Per-Unit Quantities  
Transmission Lines Parameters  
Load Flow Analysis using Gauss-Seidel  
Symmetrical Fault Analysis  
Symmetrical Components  
Unsymmetrical Fault Analysis  
System Protection  
Power System Steady-State and Transient Stability

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<sup>1</sup>: 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]

<sup>1</sup>Numbers in brackets refer to method(s) used to evaluate the course objective.

**Relationship to Program Outcomes (only items in dark print apply)<sup>2</sup>:** 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]

<sup>2</sup>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:** Dr. Reem Salim

**Date:** 01/14/2026

Revised 01/25/13

01/10/14

01/04/15

01/11/18

01/03/22