

The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 5304 – Computer-Aided Power Systems Analysis

Syllabus

Catalog Description:

Modeling of electric power systems. Fault Analysis, symmetrical components, sequence networks, load flow, stability studies. Application of computer methods to power system analysis. Machine dynamics and transients in power system analysis. Three hours of lecture per week.

Prerequisites: EENG 4310 (or equivalent)

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 Objectives¹: 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]

¹Numbers 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. **Breadth and Depth:** Students will be able to apply knowledge at a graduate level in two of the following areas: electronics, power systems, controls, advanced engineering. [1-4]
2. **Modern Engineering Tools:** Students will be able to use modern engineering tools for analysis and design as applied to engineering problems. [5-6]
3. **Advanced Engineering Mathematics:** Students will be able to apply principles of advanced engineering mathematics including probability and statistics to engineering. [7-9]
4. **Systems Design:** Students will be able to apply systems design approaches including modeling and simulation of interacting sub-systems to complex engineering problems.
5. **Design Methods:** Students will be able to demonstrate application of design methodology by comparing and evaluating solutions to engineering problems.
6. **Communication Skills:** Students will demonstrate effective oral, visual and written communication skills from a technical perspective [10-12].

²Numbers 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:	3.0	hours
General Education Component:	0	hours

Prepared By: Reem Salim

Date: 01/14/2026

Revised 01/29/2013

Revised 01/04/2015

01/03/2022