**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: 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. 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].

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

Contribution to Meeting Professional Component: (in semester hours)

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|---|---|---|
| Mathematics and Basic Sciences: | 0 | hours |
| Engineering Sciences and Design: | 3.0 | hours |
| General Education Component: | 0 | hours |

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