The University of Texas at Tyler  
Department of Electrical Engineering  

Course: EENG 4310 – Electric Power Systems (Required)  

Syllabus  

Catalog Description: 
Magnetic circuits; principles of electromagnetic energy conversion; synchronous machines; three-phase induction machines; DC machines; fundamentals of power systems modeling and design; power flow analysis.

Prerequisites: EENG 3303, EENG 3305, Pre or Co-requisite MATH 3203

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


Additional Material: Reference(s):  
Weedy, Power System Analysis, John Wiley and Sons 1996.  
Matlab®  
Selected articles published in selected journals and conference proceedings  
Instructor’s lecture notes

Course Coordinator: Hassan El-Kishky, PhD, PE, Associate Professor of Electrical Engineering

Topics Covered: (paragraph of topics separated by semicolons)  
Review of 3-phase Circuits and Systems; Review of AC Power; The Per-Unit System; Induction Machines; Synchronous Machines; Introduction to Power System Modeling; Introduction to Load Flow Analysis; Short Circuit Analysis; Power Factor Correction.

Evaluation Methods: (only items in dark print apply):  
1. Examinations / Quizzes  
2. Homework  
3. Report  
4. Computer Programming  
5. Projects  
6. Research Papers  
7. Presentation  
8. Course Participation  
9. Peer Review

Course Objectives1: By the end of this course students will be able to:  
1. Solve power system problems in the per-unit system [1,4,5]  
2. Develop transformer circuit models and solve transformer problems [1,4,5]  
3. Develop 3-phase induction motor (IM) circuit models and solve IM problems [1,4,5]
4. Develop synchronous machine circuit models and solve synchronous machine problems [1,4,5]
5. Develop and analyze power transmission line models [1,4,5]
6. Determine capacitor size to improve power factor (power factor correction) [1,4,5]
7. Solve the load-flow problem in simple power systems using the Gauss-Seidel method [1,4,5]
8. Develop short analysis and determine the fault current in a simple power system [1,4,5]

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

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering [1-8].
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering [1-8].
3. have the ability to analyze electrical circuits, devices, and systems [1-8].
4. have the ability to design electrical circuits, devices, and systems to meet application requirements [1-6].
5. have the ability to design and conduct experiments, and analyze and interpret experimental results.
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods [1-7].
7. have effective written, visual, and oral communication skills [8,9].
8. possess an educational background to understand the global context in which engineering is practiced, including [8,9]:
   a. knowledge of contemporary issues related to science and engineering.
   b. the impact of engineering on society.
   c. the role of ethics in the practice of engineering.
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams.
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers [1-8].

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 |

Disability Support Services
"If you have a disability, including a learning disability, for which you request an accommodation, please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Support Services counselor. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579)."

Prepared By: Hassan El-Kishky       Date: 08/15/2011