

**The University of Texas at Tyler**  
**Department of Electrical Engineering**

**Course: EENG 4110 – Electric Power Systems Lab (Elective)**

**Syllabus**

Catalog Description:

Electric power circuit measurements; magnetic circuits; transformers; synchronous machines, induction machines, and DC machines performance, measurements, and analysis.

Pre- or co-requisite: EENG 4310

Credits: 1 ( 0 hours lecture, 3 hours laboratory per week )

Text(s): N/A

Additional Material: Instructor's Lab Sheets

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

Topics Covered:

- Electric Power Measurement
- Equivalent circuit of power transformers
- Voltage regulation of power transformers
- Efficiency of power transformers
- Equivalent circuit of 3-phase induction motors
- Three-phase induction motor characteristics
- Characteristics of synchronous machines
- Transmission line modeling and voltage regulation

Evaluation Methods:

1. Examinations / Quizzes
2. Homework
3. Reports
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. set up experiments to measure the electric power [1,3,7].
2. Set up experiments to determine the equivalent circuit of a power transformer [1,3,7].
3. Set up experiments to determine the voltage regulation of a power transformer [1,3,7].
4. Setup experiments to determine to determine the efficiency of a power transformer [1,3,7]
5. Set up experiments to determine the characteristics of 3-phase induction motors [1,3,7].
6. Set up experiments to determine the characteristics of synchronous machines

# EENG 4110 Electric Power Systems Lab

Fall, 2018

Class Time: 2:00 – 4:45pm Th  
Location: RBN 1027

Coordinator: Hassan El-Kishky  
Office: RBN 2005  
Tel: (903) 565-5580 Fax: (903) 565-5877  
Email: [helkishky@uttyler.edu](mailto:helkishky@uttyler.edu)

Office Hours: 10:00-11:30 MW  
Other times by appointment

Textbook: No textbook

References: Hindmarch, Electrical Machines and Their Applications, Pergamon Press, 1970.  
MATLAB®, Mathworks

Additional: Instructor's handouts  
Materials

Software: MATLAB®

Contents:	AC Power Measurement	1 Week
	Transformer lab 1	1 Week
	Transformer Lab 2	1 Week
	Transformer Lab 3	1 Week
	Induction motors lab 1	1 Week
	Induction motors lab2	1 Week
	Lab Review	1 Week
	Exam 1	1 Week
	Synchronous machines lab 1	1 Week
	Synchronous machines lab 2	1 Week
	Transmission Line Models lab 1	1 Week
	Transmission Line Models lab 1	1 Week
	Lab Review	1 Week
	Final Exam	1 Week

Prerequisite Pre-or Co-requisite EENG 4310

Grading:

Exam 1	10%
Final Exam	15%
Labs	75%



[1,3,7].

7. Set up experiments to test power transmission lines models [1,3,7].

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

Relationship to Program Outcomes<sup>2</sup>: This course supports the following Electrical Engineering Program Outcomes, which state that our students will have: Graduates of the electrical engineering curriculum of the University of Texas at Tyler will:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering [1-9]
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering [1-9]
3. have the ability to analyze electrical circuits, devices, and systems [1-9].
4. have the ability to design electrical circuits, devices, and systems to meet application requirements.
5. have the ability to design and conduct experiments, and analyze and interpret experimental results [1-5];
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods [1-9].
7. have effective written, visual, and oral communication skills.
8. possess an educational background to understand the global context in which engineering is practiced, including.
  - 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.

<sup>2</sup>Numbers in brackets refer to course objective(s) that address the Program Outcome.

### Disability Support Service

"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:

08/20/2001  
08/14/2002  
08/23/2003  
08/25/2017  
08/17/2018