

**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 Objectives¹: By the end of this course students will be able to:

1. set up experiments to measure three-phase power and submit reports [3,6].
2. Set up experiments to determine the equivalent circuit of a power transformer and submit reports [3,6].
3. Set up experiments to determine the voltage regulation of a power transformer and submit reports [3,6].
4. Setup experiments to determine to determine the efficiency of a power transformer and submit reports [3,6]
5. Set up experiments to determine the equivalent circuit parameters of 3-phase induction motors and submit reports [3,6].

6. Set up experiments to determine the characteristics of 3-phase induction motors and write submit reports [3,6].
7. Set up experiments to determine the characteristics of synchronous machines and write submit reports [3,6].
8. Set up experiments to determine characteristics of power transmission lines and submit reports [3,6].

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

Relationship to Program Outcomes²: 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. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
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.
3. an ability to communicate effectively with a range of audiences [1-8].
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.
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.
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.

²Numbers 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
 08/21/2019
 11/06/2019
 08/02/2020

EENG 4110 Electric Power Systems Lab

Fall 2022

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

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

Office Hours: By appointment online only

Textbook: No textbook

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

Additional: Lab sheets
Materials

Software: MATLAB®

Contents:	AC Power Measurement	09/01
	Transformer lab 1	09/08
	Transformer Lab 2	09/15
	Transformer Lab 3	09/22
	Induction motors lab 1	09/29
	Induction motors lab2	10/06
	Lab Review	10/13
	Exam 1	10/20
	Synchronous machines lab 1	10/27
	Synchronous machines lab 2	11/03
	Transmission Line Models lab 1	11/10
	Transmission Line Models lab 1	11/17
	Lab Review	12/01
	Final Exam	12/08

Prerequisite Pre or corequisite EENG 4310

Grading:

Exam 1 (may include hands-on wiring)	15%
Final Exam (may include hands-on wiring)	15%
Labs (pre-lab assignment, lab session, report)	70%

Pre-lab assignments and lab reports must be submitted to Canvas!

Each lab consists of the following:

Pre-lab assignment: 10%
Hands-on lab session: 50%
Lab report: 40%

Attending lab sessions and doing the hands-on work is required!

Lab reports won't be accepted without doing the lab work!

Attending a lab session and not submitting a lab report would result in a numerical grade of "0" on this particular lab.