

The University of Texas at Tyler
Department of Electrical and Computer 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: Yasser Mahgoub

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 Student Outcomes²: This course supports the following Electrical Engineering Student Outcomes, which state that

Graduates of the electrical engineering curriculum of the University of Texas at Tyler will possess:

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.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	1.0	hours
General Education Component:	0	hours

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

Yasser Mahgoub

Date: 08/18/2020
08/12/2024
08/19/2026