

**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:** 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 Objectives<sup>1</sup>:** 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].

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

**Relationship to Student Outcomes<sup>2</sup>:** 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 [1-4].**
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 [5-8].**
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

<sup>2</sup>Numbers 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

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

**EENG 4110 - Electric Power Systems Laboratory**

**2021 Fall Semester**

**COURSE OUTLINE**

Course Coordinator:

<b>Dr. Yasser Mahgoub</b> <b>Office:</b> HEC A205 <b>Email:</b> ymahgoub@uttyler.edu <b>Office Hours:</b> TBA
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Prerequisite or co-requisite: EENG 4310

Class Location/Time: HEC B212 / Thursday 2:00–4:45 PM

Teaching Assistant: TBA

Grading Policy:

Lab Reports (6)	60%
Final Exam	35%
Participation	5%
<b>Total</b>	<b>100%</b>

Semester Schedule:

<b>Date</b>	<b>Laboratory Activities</b>	<b>Assignment Due</b>
Aug. 26	Lab 0: Equipment Familiarization	
Sep. 2	Lab 1: Three-Phase Power Measurement	
Sept. 9	Lab 1: Three-Phase Power Measurement	Lab 1 report due on Sep. 14
Sept. 16	Lab 2: Single-Phase Transformer Testing (1)	
Sept. 23	Lab 2: Single-Phase Transformer Testing (1)	Lab 2 report due on Sep. 28
Sept. 30	Lab 3: Single-Phase Transformer Testing (2)	
Oct. 7	Lab 3: Single-Phase Transformer Testing (2)	Lab 3 report due on Oct. 12
Oct. 14	Lab 4: Three-phase Induction Motor Testing	
Oct. 21	Lab 4: Three-phase Induction Motor Testing	Lab 4 report due on Oct. 26
Oct 28	Lab 5: Synchronous Alternator Testing	
Nov. 4	Lab 5: Synchronous Alternator Testing	Lab 5 report due on Nov. 9
Nov. 11	Lab 6: Power Transmission Line Testing	
Nov 18	Lab 6: Power Transmission Line Testing	Lab 6 report due on Nov. 23
Nov 25	Thanksgiving Break, no class	
Dec 2	<b>Final Exam</b>	

## **Important course management information**

1. All assignments are to be submitted through Canvas. No hard copies will be accepted.
2. Students can form groups of two and submit one report per group.
3. Lab reports are due by 11:59 PM on the due date.
4. Each assignment carries 100 points credit. A 10% penalty will be deducted per day for late reports.

### Grading scale:

90-100– A; 80-89–B; 70-79–C; 60-69 – D; <60 – F. Final scores will be rounded to the nearest integer.

### Academic Integrity:

Students should be aware that absolute academic integrity is expected of every student in all undertakings at The University of Texas at Tyler. Failure to comply can result in strong university-imposed penalties.

### Students Rights and Responsibilities:

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

### Grade Replacement/Forgiveness and Census Date Policies:

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

### State-Mandated Course Drop Policy:

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule,

a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

#### Disability Services

In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Services counselor. If you have a disability, including a learning disability, for which you request an accommodation, please contact the Disability Services office in UC 3150, or call (903) 566-7079.

#### Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

#### Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

#### Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

#### Emergency Exits and Evacuation:

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

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