

**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 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 and Computer Engineering**

**EENG 4110 - Electric Power Systems Laboratory**

**Fall 2024**

**COURSE OUTLINE**

Course Coordinator:

**Dr. Yasser Mahgoub**  
**Office:** HEC A201  
**Email:** ymahgoub@uttyler.edu  
**Office Hours:** TBA

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	30%
Attendance	10%
<b>Total</b>	<b>100%</b>

Semester Schedule:

<b>Week</b>	<b>Laboratory Activities</b>	<b>Assignments</b>
1	Lab 0: Equipment Familiarization	
2	Lab 1: Three-Phase Power Measurement	
3	Lab 1: Three-Phase Power Measurement	Lab 1 report due
4	Lab 2: Single-Phase Transformer Testing (1)	
5	Lab 2: Single-Phase Transformer Testing (1)	Lab 2 report due
6	Lab 3: Single-Phase Transformer Testing (2)	
7	Lab 3: Single-Phase Transformer Testing (2)	Lab 3 report due
8	Lab 4: Three-phase Induction Motor Testing	
9	Lab 4: Three-phase Induction Motor Testing	Lab 4 report due
10	Lab 5: Synchronous Alternator Testing	
11	Lab 5: Synchronous Alternator Testing	Lab 5 report due
12	Lab 6: Power Transmission Line Testing	
13	Lab 6: Power Transmission Line Testing	Lab 6 report due
14	Thanksgiving Break, no class	
15	<b>Final Exam</b>	

## Important course management information

1. Students may work in pairs to conduct each lab experiment; however, each student is required to submit an individual lab report.
2. All lab reports must be submitted via Canvas within one week of the assignment. Hard copies will not be accepted.
3. Lab reports must be submitted by 11:59 PM on the due date.
4. Each lab assignment is worth 100 points. A 10% penalty will be applied for each day a report is submitted late.

### 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.

### Computer Equipment Policy:

In order to take this class, integrated laboratory sessions, and quizzes/exams, you will need the following items as specified below:

- Windows 10 Computer or Mac running Windows virtualization software
- High-speed Internet connection
- Webcam (internal or external)
- NI Multisim software
- MATLAB and Simulink software

Type	Minimum	Recommended
Web Camera	640×480 resolution	1280×720 resolution
PC Users	Windows Vista	Windows 10 (10 S is not supported)
Mac Users	OS X 10.5 or higher	OS X 10.13 High Sierra
Internet Download Speed	.768 Mbps	1.5 Mbps
Internet Upload Speed	.384 Mbps	1 Mbps
RAM	1024 MB	2 GB
Ports	1935, 843, 80, 443, 61613, UDP/TCP	1935, 843, 80, 443, 61613, UDP/TCP

### 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. **All lab reports and assignments will be verified using plagiarism checking software and violations will result in a grade of zero for the lab report or assignment at a minimum, and possibly stronger penalties such as a failing grade in the course and a scholastic dishonesty report submitted to the university.**

### University Policies and Information

#### **Withdrawing from Class**

Students may [withdraw](#) (drop) from this course using the [Withdrawal Portal](#). Withdrawing (dropping) this course can impact your Financial Aid, Scholarships, Veteran Benefits, Exemptions, Waivers, International Student Status, housing, and degree progress. Please speak with your instructors, consider your options, speak with your advisor, and visit the One-Stop Service Center (STE 230) or email [enroll@uttyler.edu](mailto:enroll@uttyler.edu) to get a complete review of your student account and the possible impacts to withdrawing. We want you to make an informed decision. UT Tyler faculty and staff are here for you and often can provide additional support options or assistance. Make sure to carefully [read the implications for withdrawing from a course and the instructions](#) on using the [Withdrawal portal](#)..

Texas law prohibits students from dropping more than six courses during their entire undergraduate career\*. The six courses dropped includes those from other 2-year or 4-year Texas public colleges and universities. Consider the impact withdrawing from this class has on your academic progress and other areas, such as financial implications. We encourage you to consult your advisor(s) and Enrollment Services for additional guidance. **CAUTION #1:** Withdrawing before census day does not mean you get a full refund. Please see the [Tuition and Fee Refund Schedule](#). **CAUTION #2:** All international students must check with the [Office of International Programs](#) before withdrawing. All international students are required to enroll full-time for fall and spring terms. **CAUTION #3:** All UT Tyler Athletes must check with the Athletic Academic Coordinator before withdrawing from a course. **CAUTION #4:** All veterans or military-affiliated students should consult with the [Military and Veterans Success Center](#).

\* Students who began college for the first time before 2007 are exempt from this law.

### Artificial Intelligence Statement

UT Tyler is committed to exploring and using artificial intelligence (AI) tools as appropriate for the discipline and task undertaken. We encourage discussing AI tools' ethical, societal, philosophical, and disciplinary implications. All uses of AI should be acknowledged as this aligns with our commitment to honor and integrity, as noted in UT Tyler's Honor Code. Faculty and students must not use protected information, data, or copyrighted materials when using any AI tool. Additionally, users should be aware that AI tools rely on predictive models to generate content that may appear correct but is sometimes shown to be incomplete, inaccurate, taken without attribution from other sources, and/or biased. Consequently, an AI tool should not be considered a substitute for traditional approaches to research. You are ultimately responsible for the quality and content of the information you submit. Misusing AI tools that violate the guidelines specified for this course is considered a breach of academic integrity. The student will be subject to disciplinary actions as outlined in UT Tyler's Academic Integrity Policy.

For this course, **AI is not permitted in this course at all.** I expect all work students submit for this course to be their own. I have carefully designed all assignments and class activities to support your learning. Doing your own work, without human or artificial intelligence assistance, is best for your efforts in mastering course learning objectives. For this course, I expressly forbid using ChatGPT or any other artificial intelligence (AI) tools for any stages of the work process, including brainstorming. Deviations from these guidelines will be considered a violation of UT Tyler's Honor Code and academic honesty values.

*The work submitted by students in this course will be generated by themselves. This includes all process work, drafts, brainstorming artifacts, editing, and final products. This extends to group assignments where students must create collaboratively create the project. Any instance of the following constitutes a violation of UT Tyler's Honor Code: a student has another person/entity do any portion of a graded assignment, which includes purchasing work from a company, hiring a person or company to complete an assignment or exam, using a previously submitted assignment and/or using AI tools (such as ChatGPT).*

### Final Exam Policy

Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the Dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members must maintain student final examination papers for a minimum of three months following the examination date.

### Incomplete Grade Policy

If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in place of a grade *only when all of the following conditions are met:* (a) the student has been making satisfactory progress in the course; (b) the student is

unable to complete all coursework or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor, and (c) the student presents these reasons before the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average.

The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to meet all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has yet to be assigned within one year, then the Incomplete will be changed to an F, or NC. If the course was initially taken under the CR/NC grading basis, this may adversely affect the student's academic standing.

### **Grade Appeal Policy**

Disputes regarding grades must be initiated within sixty (60) days from the date of receiving the final course grade by filing a Grade Appeal Form with the instructor who assigned the grade. A grade appeal should be used when the student thinks the final course grade awarded does not reflect the grades earned on assessments or follow the grading scale as documented in the syllabus. The student should provide the rationale for the grade appeal and attach supporting document about the grades earned. The form should be sent via email to the faculty member who assigned the grade. The faculty member reviews the rationale and supporting documentation and completes the instruction section of the form. The instructor should return the form to the student, even if a grade change is made at this level. If the student is not satisfied with the decision, the student may appeal in writing to the Chairperson of the department from which the grade was issued. In situations where there is an allegation of capricious grading, discrimination, or unlawful actions, appeals may go beyond the Chairperson to the Dean or the Dean's designee of the college from which the grade was issued, with that decision being final. The Grade Appeal form is found in the [Registrar's Form Library](#).

NOTE: The Grade Appeal Form is different from the Application for Appeal form submitted to the Student Appeals Committee, which does not rule on grade disputes as described in this policy.

### **Disability/Accessibility Services**

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical, and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler/> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with the Assistant Director Student Accessibility and Resources/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <https://www.uttyler.edu/disability-services>, the SAR office located in the Robert Muntz Library, LIB 460, email [saroffice@uttyler.edu](mailto:saroffice@uttyler.edu), or call 903.566.7079."

### **Military Affiliated Students**

UT Tyler honors the service and sacrifices of our military-affiliated students. If you are a student who is a veteran, on active duty, in the reserves or National Guard, or a military spouse or dependent, please stay in contact with your faculty member if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make your faculty member aware of any complications as far in advance as possible. Your faculty member is willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. The [Military and Veterans Success Center \(MVSC\)](#) has campus resources for military-affiliated students. The MVSC can be reached at [MVSC@uttyler.edu](mailto:MVSC@uttyler.edu) or via phone at 903.565.5972.

### Students on an F-1 Visa

To remain in compliance with Federal Regulations requirements you must do the following:

- Traditional face-to-face classes: Attend classes on the regular meeting days/times.
- Hybrid Classes: Attend all face-to-face classes convened by the instructor according to the schedule set for your specific course.
- Online course: Only one online course can count toward your full-time enrollment. Students are expected to be fully engaged and meet all requirements for the online course.

### Academic Honesty and Academic Misconduct

The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the [Student Conduct and Discipline policy](#) in the Student Manual Of Operating Procedures (Section 8).

### FERPA

UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in [University Policy 5.2.3](#). The course instructor will follow all requirements to protect your confidential information.

### Absence for Official University Events or Activities

This course follows the practices related to [Excused Absences for University Events or Activities](#) as noted in the Catalog.

### Absence for Religious Holidays

This course follows the practices related to [Excused Absences for Religious Holy Days as noted in the Catalog](#).

### Absence for Pregnant Students

This course follows the requirements of Texas Laws SB 412, SB 459, SB 597/HB 1361 to meet the needs of pregnant and parenting students. Part of the supports afforded pregnant students includes excused absences. Faculty who are informed by a student of needing this support should make a referral to the Parenting Student Liaison. NOTE: Students must work with the Parenting Student Liaison in order to receive these supports. Students should reach out to the Parenting Student Liaison at [parents@uttyler.edu](mailto:parents@uttyler.edu) and also complete the [Pregnant and Parenting Self-Reporting Form](#).

### Campus Carry

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>.

### Student Resources:

#### Resources to assist you in the course

- [UT Tyler Student Accessibility and Resource \(SAR\) Office](#) (provides needed accommodations to students with document needs related to access and learning)
- [UT Tyler Writing Center](#)
- [The Mathematics Learning Center](#)
- [UT Tyler PASS Tutoring Center](#)
- [UT Tyler Supplemental Instruction](#)
- [Upswing \(24/7 online tutoring\) - covers nearly all undergraduate course areas](#)
- [Robert Muntz Library](#) and [Library Liaison](#)
- [Canvas 101](#) (learn to use Canvas, proctoring, Unicheck, and other software)
- Digital Support Toolkit (for supported courses only. Students are automatically enrolled in the toolkit for supported courses)
- LIB 422 -- Computer Lab where students can take a proctored exam

- [The Career Success Center](#)
- [UT Tyler Testing Center](#)
- [Office of Research & Scholarship Design and Data Analysis Lab](#)

#### Resources available to UT Tyler Students

- [UT Tyler Counseling Center](#) (available to all students)
- [MySSP App](#) (24/7 access to Student Support Program counseling through phone or chat and online wellness resources available in a variety of languages)
- [Student Assistance and Advocacy Center](#)
- [Military and Veterans Success Center](#) (supports for our military-affiliated students)
- [UT Tyler Patriot Food Pantry](#)
- [UT Tyler Financial Aid and Scholarships](#)
- [UT Tyler Student Business Services](#) (pay or set up payment plans, etc.)
- [UT Tyler Registrar's Office](#)
- [Office of International Programs](#)
- [Title IX Reporting](#)
- [Patriots Engage](#) (available to all students. Get engaged at UT Tyler.)