



**SYLLABUS FOR  
EE 309 – FUNDAMENTALS OF ELECTRICAL AND  
ELECTRONICS ENGINEERING**

**TED UNIVERSITY**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**Academic Year & Semester**

2022 Fall

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<b>Course Code</b>	EE 309	<b>Course Title</b>	Fundamentals of Electrical and Electronics Engineering	
<b>Type of Course</b>	<input checked="" type="checkbox"/> Compulsory <input type="checkbox"/> Elective	<b>Semester</b>	<input checked="" type="checkbox"/> Fall <input type="checkbox"/> Spring <input type="checkbox"/> Summer	
<b>Credit Hours / ECTS credits</b>	(2+0+2) 3 Credits / 4 ECTS	<b>Pre-requisite</b>	NONE	
		<b>Co-requisite</b>	NONE	
<b>Mode of Delivery</b>	<input checked="" type="checkbox"/> Face-to-face <input type="checkbox"/> Distance learning	<b>Language of Instruction</b>	<input checked="" type="checkbox"/> English <input type="checkbox"/> Turkish	
<b>Course Level</b>	<input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate (MS) <input type="checkbox"/> Graduate (PhD)	<b>Year of Study</b>	<input type="checkbox"/> First Year	<input type="checkbox"/> Masters
			<input type="checkbox"/> Sophomore	<input type="checkbox"/> Doctorate
			<input checked="" type="checkbox"/> Junior	
			<input type="checkbox"/> Senior	

<b>Course Coordinator</b>	Asst. Prof. Serkan Sahin E-mail: <a href="mailto:serkan.sahin@tedu.edu.tr">serkan.sahin@tedu.edu.tr</a>   Room: B147   Phone: +90 (312) 585 0542		
<b>Office Hours</b>	To be determined		
<b>Teaching Assistant(s)</b>	To be determined		
<b>Office Hours</b>	To be determined	To be determined	
<b>Course Schedule</b>	Section 01	Tuesday (14:00–16:00) @H207, Wednesday (09:00–11:00) @A317-L	

<b>Catalog Description</b>	Basic electrical and electronic components and circuits. Circuit analysis. Analysis of first order circuits. Phasors. Steady-state alternating current analysis. Fundamentals of electromechanical energy conversion. Alternating current power. Three phase. Transformers. Electrical safety. (Offered for non-EE students.)
<b>Course Objectives</b>	The goal of this course is to give a concise and working knowledge of basic Electrical and Electronics Engineering topics to non-EE engineering students (mechanical engineering department). The course aims to introduce some core concepts of EE, such as circuits and systems, sinusoidal steady-state and three-phase circuit analysis, electrical power, and electric machinery. By the end of this course, the non-EE students will have enough background when faced with an electrical engineering problem in their field of interest.
<b>Required Reading</b>	Rizzoni, G., & Kearns, J. (2015). <i>Principles and Applications of Electrical Engineering</i> . 6 <sup>th</sup> Ed. McGraw-Hill Education.
<b>Suggested / Recommended Reading</b>	Nilsson, J. W., & Riedel, S. A. (2019). <i>Electrical Circuits</i> . 10 <sup>th</sup> Ed. Prentice-Hall.
<b>Software Usage</b>	MATLAB
<b>Course Learning Outcomes (LOs)</b>	Having successfully completed this course, students will be able to: LO-1: Learn the fundamentals of electric circuit elements. LO-2: Understand Kirchhoff's current and voltage laws. LO-3: Understand Ohm's Law. LO-4: Analyze AC circuits.



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	LO-5: Understand the operation of sinusoidal steady-state and three-phase circuits. LO-6: Understand transient analysis. LO-7: Learn the first-order circuit analysis. LO-8: Understand the power in the AC circuit. LO-9: Understand transformers. LO-10: Understand magnetic circuits. LO-11: Learn electromechanical energy conversion.
<b>Course Evaluation</b>	Course feedback survey will be conducted in the last two weeks of the semester.
<b>Course Web Page</b>	The class has already been enrolled in Moodle ( <a href="https://lms.tedu.edu.tr/">https://lms.tedu.edu.tr/</a> ). All announcements and course-related materials will be posted on the Moodle course page.
<b>Some Useful Website References</b>	N/A

<b>Learning Activities &amp; Teaching Methods</b>	<input checked="" type="checkbox"/> Brainstorming <input checked="" type="checkbox"/> Case Study/Scenario Analysis <input checked="" type="checkbox"/> Collaborating <input type="checkbox"/> Concept Mapping <input checked="" type="checkbox"/> Demonstrating <input checked="" type="checkbox"/> Discussions / Debates <input type="checkbox"/> Drama / Role Playing <input checked="" type="checkbox"/> Experiments <input type="checkbox"/> Field Trips <input type="checkbox"/> Guest Speakers	<input checked="" type="checkbox"/> Hands-on Activities <input checked="" type="checkbox"/> Inquiry <input type="checkbox"/> Microteaching <input type="checkbox"/> Oral Presentations / Reports <input type="checkbox"/> Peer Teaching <input type="checkbox"/> Predict-Observe-Explain <input checked="" type="checkbox"/> Problem Solving <input checked="" type="checkbox"/> Questioning <input type="checkbox"/> Reading	<input type="checkbox"/> Scaffolding / Coaching <input type="checkbox"/> Seminars <input type="checkbox"/> Service Learning <input type="checkbox"/> Simulations & Games <input checked="" type="checkbox"/> Telling / Explaining <input type="checkbox"/> Think-Pair-Share <input type="checkbox"/> Video Presentations <input checked="" type="checkbox"/> Web Searching <input type="checkbox"/> Other(s):.....
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<b>Assessment Methods &amp; Criteria</b>	<input type="checkbox"/> Case Studies / Homework	(...%)	<input type="checkbox"/> Presentation (Oral, Poster)	(...%)
	<input checked="" type="checkbox"/> Lab Assignment	<b>(20%)</b>	<input type="checkbox"/> Project	(...%)
	<input type="checkbox"/> Observation	(...%)	<input checked="" type="checkbox"/> Quiz	<b>(10%)</b>
	<input type="checkbox"/> Oral Questioning	(...%)	<input type="checkbox"/> Self-evaluation	(...%)
	<input type="checkbox"/> Peer Evaluation	(...%)	<input checked="" type="checkbox"/> Test/Exam	<b>(70%)</b>
	<input type="checkbox"/> Performance Project (Written, Oral)	(...%)	<input type="checkbox"/> Other(s):.....	(...%)
	<input type="checkbox"/> Portfolio	(...%)		

<b>Student Workload</b>	<input type="checkbox"/> Case Study Analysis	(... hrs)	<input type="checkbox"/> Online Discussion	(... hrs)
	<input checked="" type="checkbox"/> Course Readings	<b>(42 hrs)</b>	<input type="checkbox"/> Oral Presentation	(... hrs)
	<input type="checkbox"/> Debate	(... hrs)	<input type="checkbox"/> Poster Presentation	(... hrs)
	<input type="checkbox"/> Demonstration	(... hrs)	<input type="checkbox"/> Report on a Topic	(... hrs)
	<input checked="" type="checkbox"/> Exams/Quizzes	<b>(42 hrs)</b>	<input type="checkbox"/> Research Review	(... hrs)
	<input type="checkbox"/> Field Trips/Visits	(... hrs)	<input type="checkbox"/> Resource Review	(... hrs)
	<input type="checkbox"/> Hands-on Work	(... hrs)	<input type="checkbox"/> Team Meetings	(... hrs)
	<input checked="" type="checkbox"/> Lab Applications	<b>(28 hrs)</b>	<input type="checkbox"/> Web Designs	(... hrs)



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<input checked="" type="checkbox"/> Lectures	<b>(28 hrs)</b>	<input type="checkbox"/> Work Placement	(... hrs)
<input type="checkbox"/> Mock Designs	(... hrs)	<input type="checkbox"/> Workshop	(... hrs)
<input type="checkbox"/> Observation	(... hrs)	<input type="checkbox"/> Other(s):	(... hrs)
<b>Total Workload</b>			<b>140 hrs</b>

## TENTATIVE OUTLINE

*Any changes and updates will be announced on the course web page.*

Week	Topics	LOs	Textbook Reading	Assignments
1	Fundamentals of Electric Circuits	1–3	Ch. 1, 2	
2	Fundamentals of Electric Circuits	1–3	Ch. 2	
3	The Analysis of Resistive Circuits	1–3	Ch. 3	Quiz#1
4	The Analysis of Resistive Circuits <b>Lab#1:</b> Introduction to Electrical Circuit Laboratory	1–3	Ch. 3	Lab#1
5	AC Network Analysis	1, 4, 5	Ch. 4	Quiz#2
6	AC Network Analysis	1, 4, 5	Ch. 4	
7	AC Network Analysis <b>Lab#2:</b> Introduction to Mixed Signal Oscilloscope and Waveform Generator	1, 4, 5	Ch. 4	Quiz#3 Lab#2
8	Transient Analysis	6, 7	Ch. 5	<b>Midterm Exam#1</b>
9	Transient Analysis <b>Lab#3:</b> Capacitors and Inductors	6, 7	Ch. 5	Lab#3
10	Transient Analysis	6, 7	Ch. 5	
11	AC Power <b>Lab#4:</b> Transformers	8, 9	Ch. 7	<b>Midterm Exam#2</b> Lab#4
12	AC Power	8, 9	Ch. 7	
13	AC Power	8, 9	Ch. 7	Quiz#4
14	Principle of Electromechanics (if time permits)	10, 11	Ch. 13	
<b>FINAL EXAMS WEEK (date and time to be announced later).</b>				

## COURSE ASSIGNMENTS & GRADING

### **A. Midterm Exams [40%]**

There will be two midterm exams. The exams can be online or in-class. The date and how it is taken will be announced later.



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## B. Final Exam [30%]

There will be a cumulative closed-book final exam covering all topics. You are not allowed to use cheat sheets in the exam. The date and time of the final exam will be announced at the end of the semester.

## C. Quizzes [10%]

There will be 4 quizzes, 2.5% for each quiz. The method of conducting the quizzes will be explained later.

## D. Lab Assignments [20%]

There will be 4 experiments, each contributing 5% to the overall grade. For each experiment, you will be required to prepare a prelab report, a final report, and attend a post quiz.

**Lab Grading:** Lab Performance [10%], Preliminary reports [30%], Final lab reports [40%], Lab Quiz [20%]

## COURSE ASSESSMENTS & LEARNING OUTCOMES MATRIX

Assessment Methods	Course Learning Outcomes
Lab Assignments	LO# 1–11
Quizzes	LO# 1–11
1 <sup>st</sup> Midterm Exam	LO# 1–5
2 <sup>nd</sup> Midterm Exam	LO# 6, 7
Final Exam	LO# 1–11

## COURSE POLICIES

### I. Attendance

- Regular class attendance is expected for all students at the University. You are not required but advised to attend all classes.
- Please send your professor a brief e-mail to explain your absence in advance.
- Your absence will not reduce your attendance rate *if and only if* you have a legitimate reason for missing a class (such as illness, death in the family, a traffic accident, *etc.*).
- In case of a disease or emergency, you must supply formal documentation that supports your claim.
- Classes start at the hour. Please be respectful of your classmates by being on time.
- All electronic equipment should be turned off and kept out of sight before the lecture starts.

About the *laboratory sessions*:

- The students should attend all the experiments. Those who miss two experiments without any allowable excuse (medical report or coinciding exams) will fail the laboratory.
- You have only one right to be absent from experiments.
- Make-ups may only be given to those who have allowable excuses. If you have a medical report or a conflicting exam, you should consult your assistant with a written formal request and your request will be assessed whether you will be given a make-up.
- Students who missed lab quizzes (including make-ups) will not be allowed to take lab quizzes.

### II. Make-up Policy (for Exams and Assignments)

There will be a single make-up exam for Midterm Exam 1 and 2 which will be available if and only if you have a legitimate reason for missing the exam (such as illness, death in the family, a traffic accident, *etc.*). In case of an illness or emergency, you must supply formal documentation that supports your claim. The topics for the make-up exam are from everything that is covered in class at the time of the exam. There will be *no* make-up for the quizzes.

### III. Preliminary Lab Report

Preliminary work occurs from reading assignments, numerical calculations, and computer simulations. Each student should prepare his/her preliminary work and submit it at the beginning of the experiment. **The works**



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should be neatly written on A4 white paper. The graphs should be plotted on a computer and past to the A4 paper. The outcomes of computer simulations should be added to the preliminary work.

Your preliminary reports should be limited to a maximum of 5 pages without a cover page. Only those students who have submitted the preliminary work at the beginning of the laboratory will be allowed to experiment!

#### IV. Lab Quizzes

A quiz will be given at the beginning of each experiment (except the introductory experiments at the beginning of the semester). The quiz questions will cover the subjects included in the preliminary works (including the reading assignments).

#### V. Equipment

Each team has to bring a **scientific calculator and a flash disk**. The calculator may be used during the quiz and the experiment. The students are responsible for the equipment on their experiment table. The equipment should be checked at the beginning of each laboratory session and in case of any missing equipment, the students should inform their assistants. Exchanging of equipment is not allowed among the tables without the permission of the assistant. **At the end of each experiment, one of the datasheets (if available) (last page of the lab manual) must be submitted to the course assistant.** The other datasheet must be kept by the students and used for the final report.

#### VI. Final Lab Report

A final report about the experiment should be prepared after the experiment and **submitted before the next laboratory session.** (Deadline for the last experiment will be announced by the assistant.) The reports should be neatly written on A4 white paper and prepared via computer. The graphs should be added to this paper. Each team of two students will submit one final report including:

- Name of the students
- Name of the assistant
- Date
- Name of the experiment
- The objective of the experiment
- Graphical results, measurements, and answers to the questions
- Comparison of the results with the expected ones and comments
- Conclusions

Please see the following parts of this document to learn how to prepare a reasonable report. **Your final lab reports should be limited to a maximum of 5 pages without a cover page.**

#### VII. Late Submission Policy

Late submissions will not be graded. Missed quizzes will result in a grade of zero (0).

#### VIII. Cheating & Plagiarism

Collaboration is strongly encouraged; however, the work you hand in must be solely your own. Cheating and plagiarism are severe offenses and will be penalized accordingly by the university disciplinary committee. Cheating has a comprehensive description which can be summarized as "acting dishonestly." Some of the things that can be considered cheating are the following:

- Copying answers on exams, home works and lab works,
- Using prohibited material on exams,
- Lying to gain any advantage in class,
- Providing false, modified, or forged data in a report,
- Plagiarizing (see below),
- Modifying graded material to be re-graded,
- Causing harm to colleagues by distributing false information about an exam, homework, or lab.

All of the following are considered plagiarism ([www.plagiarism.org](http://www.plagiarism.org)):



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- Turning in someone else's work as your own,
- Copying words or ideas from someone else without giving credit,
- Failing to put a quotation in quotation marks,
- Giving incorrect information about the source of a quotation,
- Changing words but copying the sentence structure of a source without giving credit,
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.

**IX. Disability Support**

If you have a disabling condition that may interfere with your ability to complete this course successfully, please contact Dr. Serkan Sahin (e-mail: [serkan.sahin@tedu.edu.tr](mailto:serkan.sahin@tedu.edu.tr)). For more information, please see the [Handbook for Registered Students](#) (Turkish Content).

<b>Prepared By</b>	Asst. Prof. Serkan Sahin	<b>Date</b>	21/09/2022
<b>Revised By</b>	Asst. Prof. Serkan Sahin	<b>Rev. Date</b>	21/09/2022

## HOW TO PREPARE A FINAL LAB REPORT

Engineers, scientists, and managers write reports to communicate the results of research, fieldwork, and other activities. Often, a report is the only concrete evidence of your research, and the quality of the research may be judged directly by the quality of the writing and how well you convey the importance of your findings. Content, organization, and clarity are the keywords to remember when preparing a report.

Reporting the results obtained from an experiment is as important as experimenting. A sloppy report significantly deducts from the value of the results. Therefore, a properly prepared report is very important. Fortunately, a lab report has a fairly consistent format that will help you to organize your information. This document covers some important points on how to prepare a proper report.

The lab report must include:

- The title of the experiment
- The names and the ID numbers of the students (Upper left corner)
- The name of your teaching assistant (Upper left corner)
- The date that the lab was performed (Upper right corner)
- The lab section (Upper right corner)

There are three main sections of the laboratory report.

- Objective
- Results
- Conclusion

1) **Objective:**

**You may describe the objectives of experiments in one or two sentences.** The objective section in the report should not be copied directly from this section of the manual.

2) **Results:**

This section contains the results obtained in the experiment: **data tables and graphs.**

3) **Conclusion:**

**You should compare your results against expectations from theory/simulation results, and quantify the differences.** If the errors are significant, then **you should state the possible reasons for errors.** You should conclude the points of your results. The expression of results (graphs/data) mustn't be considered as a "conclusion". Please, try to comment on results, not to narrate the experimental process.

**Your reports should be limited to a maximum of 5 pages without a cover page.** You should briefly summarize your results and conclusion.

### **Data Tables**

Tables are effective and concise tools to summarize results and point to differences across parameters. It is a good habit to think of plan out the data you would like to get from an experiment by preparing tables before starting any measurement. The units should always be included along with the data.

Ali Velioglu 199999-9	19-9-2010
Ahmet Mehmetoglu 200000-0	Monday Morning
Assistant:	
EXPERIMENT 1	
Introduction to Laboratory Instruments	
Object	
_____	
_____	
_____	
Results	
_____	
_____	
_____	
_____	
_____	
_____	
Conclusion	
_____	

Figure 1: Lab report format.

### Plotting the Graphs

Some of the results are presented by graphs more efficiently. Therefore, graphs are frequently used in reports.

A proper plot should obey the following rules:

- The title of the plot should be written.
- Vertical and horizontal axes should be named.
- Units of the values should always be mentioned.
- Critical values should always be mentioned.

A few important points about the reports are as follows:

- You should write in complete, grammatically correct sentences.
- If most of your sentences are long (4 or more 'clauses' or parts) you will confuse the reader. Consider making two sentences (with 3 or fewer parts in each).
- Be concise. If you can use one word instead of a phrase with two or more words, then choose the one alternative.
- Be objective. Limit your use of personal pronouns (I, you, we), emotionally loaded words (wonderful, useless, lovely), and casual or ambiguous expressions.
- Use technical terms correctly. Learn what they mean, how to use them, and how to spell them.
- Do not use contractions (isn't, doesn't, it's), While these are common in speech, informal writing the full form (is not, does not, it is) is expected.
- Do not forget to indicate units of the values.

A good lab report does more than present the data; it demonstrates the writer's comprehension of the concepts behind the data. Merely recording the expected and observed results is not sufficient; you should also identify how and why differences occurred, explain how they affected your experiment, and shows your understanding of the principles the experiment was designed to examine. Bear in mind that a format, however helpful, cannot replace clear thinking and organized writing. You still need to organize your ideas carefully and express them coherently.