TED UNIVERSITY

Syllabus for

EE 307 Electrical Circuits

Fall 2016

Instructor:	**Asst. Prof. Çiçek Boztuğ**
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Time Schedule:	**Tuesday (12.00 – 13.50), Thursday (14.00 – 15.50)**
Office Hours:	**Tuesday (15.00 –16.00)** **(or by appointment)**

Course Code & Number	EE307	Course Title	Electrical Circuits
Type of Course	☑ Compulsory ☐ Elective	**Semester**	☑ Fall ☐ Spring ☐ Summer
Level of Course	BSc	**Year of Study**	Junior
Course Credit Hours / ECTS	(2+0+2) 3 / 6 ECTS	**Pre-requisite / Co-requisite**	Pre-requisite: MATH 101 Co-requisite: -
Mode of Delivery	☑ Face-to-face ☐ Distance learning	**Language of Instruction**	☑ English ☐ Turkish
Course Coordinator	Asst. Prof. Çiçek Boztuğ Phone: 0312-5850168 E-mail: cicek.boztug@tedu.edu.tr		
Computer Usage	MATLAB and SPICE assignments		
Textbook	1) J.W. Nilsson and S. Riedel, "Electric Circuits," 10th Ed., Prentice Hall, 2015 2) Jaeger, Richard C., Blalock, Travis N., "Microelectronic Circuit Design", 4th Ed. McGraw Hill.		
Supplementary Reading	1) Alexander and Sadiku, "Fundamentals of Electric Circuits", 4th Ed., McGraw Hill, 2009. 2) Hayt, Kemmerly, and Durbin, "Engineering Circuit Analysis", 7th Ed., McGraw Hill, 2007. 3) D.E. Johnson, J.R. Johnson, J.L. Hilburn, P.D. Scott, "Electric Circuit Analysis", Wiley, 1992.		
Module and Instructor Evaluation Date	Evaluation will be held on the last day of the class		

Course Catalog Description	Fundamentals of electric circuits, variables and lumped circuit elements. Kirchhoff's laws. Resistive circuits. Methods of circuit analysis. Operational amplifiers. Energy storage elements. Analysis of first order circuits. Basic semiconductor concepts. Models of p-n junction diodes, bipolar junction transistors (BJT), and metal oxide semiconductor field effect transistors (MOSFET). Logic gates: Inverters, input and output circuits, Not-AND (NAND) and Not-OR (NOR) gates. (offered for non-EE students)
Course Objectives	The goal of this course to develop an understanding of the electrical circuits for non-EE students (computer engineering department). Elements of electric circuits and the fundamental laws, general techniques such as nodal, mesh analysis and steady-state AC analysis will be covered. Study on energy storage elements will help students to understand the transient and the steady-state response of first order circuits. The course also aims to introduce elementary electronic circuits such as operational amplifiers and semiconductor devices such as diodes and BJTs. In addition, the course will provide the basic principles of digital circuits emphasing their transistor level implementations. The course will also introduce basic measurement equipments setups and techniques by conducting experiments at the basic electronics laboratory.
Course Learning Outcomes (LO)	Having successfully completed this course, students will be able to: 1. Interpret the basic circuit concepts, such as voltage, current, power, energy, etc. 2. Use node and mesh analyses methods for the analysis of linear time invariant circuits. 3. Analyze circuits with operational amplifiers. 4. Interpret the operation of capacitors and inductors; and analyze both transient and steady-state response of first order circuits.

5. Identify p-n junction diodes, BJTs, and MOSFETs.
6. Analyze the transistor level circuits of logic gates including inverters, NAND and NOR.
7. Identify the basic measurement instruments to perform experiments on electrical circuits.
8. Perform experiments on resistive circuits.
9. Perform experiments on opamp circuits.
10. Perform experiments with diodes and BJTs.

	TENTATIVE COURSE OUTLINE			
Week	**Topics**	**Learning Outcome (LO)**	**Textbook Reading**	**Assignments / Exams**
1	Introduction to Electrical Circuits	1	Ch. 1 (Tb1)	
2	Resistive Circuits; Sources; measurement equipments	1	Ch. 2, 3(Tb1)	
3	Linearity; Nodal Analysis **Recitation**	2	Ch. 3, 4 (Tb1)	
4	Nodal Analysis; Mesh Analysis **Recitation**	2	Ch. 4 (Tb1)	Quiz #1
5	Mesh Analysis **Exp1**: Introduciton to Electrical Circuit Laboratory	2,7,8	Ch. 4 (Tb1)	
6	Thevenin's and Norton's theorems; **Recitation**	2	Ch. 4 (Tb1)	Quiz #2
7	Analysis of Op-Amp Circuits **Exp2**: DC and AC Analysis on Resistive Circuits	3,7,8	Ch. 5 (Tb1)	
8	Energy-Storage Elements **Recitation**	4	Ch. 6 (Tb1)	**Midterm # 1**
9	First-Order Circuits **Recitation**	4	Ch.7 (Tb1)	
10	Basic Semiconductor Concepts **Exp3**: Operational Amplifiers	5,7,8,9	Ch. 2 (Tb2)	Quiz #3
11	Operation of p-n Junction diodes **Exp4**: Capacitors and Inductors	5,7	Ch. 3 (Tb2)	
12	Operation of BJTs **Recitation**	5	Ch. 5 (Tb2)	
13	Logic Gates: Inverters, NAND and NOR gates **Exp5**: Zener Diodes	6,7,10	Ch. 9 (Tb2)	**Midterm # 2**
14	Logic Gates: Inverters, NAND and NOR gates **Exp6**: BJT Characteristics and Biasing	6,7,10	Ch. 9 (Tb2)	Quiz #4
	FINAL EXAMS WEEK, January 02-14, 2017 (date and time to be announced later).			

COURSE ASSIGNMENTS

A. Midterm Exams [40%]

There will be 2 closed-book midterm exams, 20% for each exam. Exam 1 and Exam 2 will be on the 8th and 13th week, respectively. Date and time of the exams will be announced later.

B. Final [30%]

There will be a cumulative closed-book final exam covering all topics. Date and time of the final will be announced at the end of the semester.

C. Quizzes [12%]

There will be 4 quizzes, 3% for each quiz.

D. Lab Reports [18%]

There will be 6 labs, 3% for each lab report.

COURSE ASSESSMENTS & LEARNING OUTCOMES MATRIX

Assessment Methods	Course Learning Outcomes
Laboratory Work	LO # 7…10
Quizzes	LO # 1…6
1st Midterm Exam	LO # 1…3
2nd Midterm Exam	LO # 4…6
Final Exam	LO # 1…6

Teaching Methods & Learning Activities	☑ Telling/Explaining ☑ Questioning ☑ Reading ☑ Problem Solving	☑ Collaborating ☑ Web Searching ☑ Hands-on Activities ☑ Other(s): Homework and MATLAB/Spice assignments
Assessment Methods (Formal & Informal)	☑ Test/Exam ☑ Quiz ☑ Hands-on Activities	
Student Workload (Total 150 Hrs)	☑ Lectures ....**28**.. hrs ☑ Course Readings ....**28**.. hrs ☑ Lab Applications ....**14**. hrs ☑ Recitation ....**14**.. hrs ☑ Hands-on Work ....**14**.. hrs	☑ Quizzes ……................................**10**.. hrs ☑ Midterm I…….............................**12**.. hrs ☑ Midterm II…….............................**12**.. hrs ☑ Final……......................................**18**.. hrs

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 family, a traffic accident, etc.). In case of an illness or emergency, you must supply a formal documentation that supports your claim.
- Classes start on 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 lecture starts.
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II. Make-up Exams
Make-ups for Midterm Exams 1 and 2 will be available *if and only if* you have a legitimate reason for missing the exam (such as illness, death in family, a traffic accident, etc.). In case of an illness or emergency, you must supply a formal documentation that supports your claim.

III. Late Submission Policy
Late submissions will not be graded. There will be *no* make-up for quizzes and experiments. Late-submitted lab reports and missed quizzes will result in a grade of zero (0).

IV. Participation
In their book, The Adult Student's Guide to Survival & Success, Al Siebert and Mary Karr suggest that the most effective learning technique of all is to study by *asking and answering questions*. Develop the habit of reading textbooks, taking lecture notes, and studying by asking and answering questions. When you do this, you save many hours of studying and have time to spend with your family or friends.

There are several ways to go about asking and answering questions.

- When studying on your own, write questions that occur to you while you're reading and then go back and find the answers.
- If you're part of a study group, make a list of questions to ask the group.
- In the classroom, participate fully by asking questions and answering the ones posed by your instructor.

V. Cheating & Plagiarism

Collaboration is strongly encouraged; however, the work you hand in must be solely your own. Cheating and plagiarism are very serious offenses and will be penalized accordingly by the university disciplinary committee.

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following:
- Copying answers on exams, homeworks and lab works,
- Using prohibited material on exams,
- Lying to gain any type of advantage in class,
- Providing false, modified or forged data in a report,
- Plagiarising (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:
- 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.
(www.plagiarism.org)

*** GOOD LUCK ***