Faculty of Engineering & Technology

Electrical Circuits 1

Information :

Course Code :	EPR 261	Level	:	Undergraduate	Course Hours :	4.00- Hours

Department :	Department of Electrical Engineering

Instructor Information :

Title	Name	Office hours
Associate Professor	Moneer Mohamed Ali Abu-Elnaga	4
Assistant Lecturer	Ahmed Moreab Hussien Mohamed	10
Assistant Lecturer	SHEROUK SOBHI ABDELSALAM FOUDA	

Area Of Study :

The Main Goals of this course are:
 Ádevelop the students' knowledge about the fundamentals and main components of
electrical circuits.
 Áprepare students to analyze DC electrical circuits using different techniques and
theorems.
 Ádevelop the students' knowledge about the characteristics of inductance and
capacitance.
 Áprepare students to analyze AC electrical circuits using different techniques and
theorems.
 Ádevelop student's practical skills on testing electrical circuits.

Description :

Basic electrical quantities, Ohmçs Law and Kirchhoffçs Laws, resistance and source
combinations, voltage and current division. Techniques of solving DC electric circuits:
nodal and mesh analysis, source transformation. Theorems: superposition, and
V@.ç^}ãçs theorem. AC sinusoidal sources, time domain and frequency domain, voltages
and currents phasor diagrams, inductance and capacitance: voltage and current
relationships, impedance and admittance. Techniques of solving AC electric circuits:
nodal and mesh analysis, source transformation. Theorems: superposition, and
V@.ç^}ãçs theorem.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	a1.Describe the fundamentals and main components of electrical circuits including Ohm's law, Kirchhoffçs laws, resistance and source combinations, and voltage and current division.
2 -	a2. Illustrate techniques for solving of DC electrical circuits including nodal and mesh analysis and source transformation.
3 -	a+EZÖ^•&¦ã^Áó@[¦^{•Á[¦Á[¦çãÄ*ÁÖÔÁ^¦^&dãèa¦&ã&˘ã±Áã&¦˘åãã*Á˘]^¦][•ãäã}Êãè)åÁ/@.ç^}ãçs theorem.
4 -	a4. Illustrate the characteristics of inductance and capacitance
5 -	a5. Define the impedance, admittance, and phasors for AC electric circuits.

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6 -	a6. Illustrate solving techniques and theorems of solving AC electric circuits.

b.Intellectual Skills: :

1 -	b1. Apply basic laws for solving simple electric circuits.
2 -	b2. Apply different techniques for solving DC electric circuits.
3 -	b3. Apply different theorems for solving DC electric circuits.
4 -	b4. Evaluate the characteristics of inductance and capacitance.
5 -	b5. Deduce the current and voltage phasor diagrams.
6 -	b6. Apply different techniques and theorems for solving AC electric circuits.

c.Professional and Practical Skills: :

1 -	c1. Test electrical components.
2 -	c2. Apply basic laws on simple circuits in the lab.
3 -	c3. Apply theorems for solving simple circuits in the lab.

d.General and Transferable Skills: :

1 -	d1. Work coherently and successfully as a part of a team in the Lab.
2 -	d2. Work in stressful environment and within constraints.
3 -	d3. Communicate effectively.
4 -	d4. Manage tasks, time, and resources effectively.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Basic concepts, components of Electric Circuits.	6	3	3
Basic laws , and voltage and current division.	12	6	6
Techniques of DC circuit analysis.	18	9	9
Theorems of DC circuit analysis.	12	6	6
AC sinusoidal sources, Time domain and frequency domain	6	3	3
Phasor and impedance	12	6	6
Inductance and Capacitance	12	6	6
Techniques and Theorems of AC circuit analysis	12	6	6

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem solving
Report
Experiential learning

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Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
assignments	10.00	6	to assess the ability of implementing a simple electric circuit that shows knowledge and understanding of different technical issues.
final	40.00	1	to assess the attendacne of the students
lab Experiments	10.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied.
Mid Term Exam 1	15.00	7	to assess the skills of problem solving, understanding of related topics.
Mid Term Exam 2	15.00	14	to assess the skills of problem solving, understanding of related topics.
Quiz	10.00	9	to assess the skills of problem solving, understanding of related topics.

Course Notes :

1. Fundamentals of Electric Circuits", C.K. Alexander and M.N.O. Sadiku, McGraw Hill, 4th edition, 2009.Students Lecture Notes (Text Book).

Recommended books :

1. C.K. Alexander and M.N.O. Sadiku, McGraw Hill, "Fundamentals of Electric Circuits", 5th edition, 2013 (Text Book).
2. J. D. Irwin and R.Mark Nelms, "Basic Engineering Circuit Analysis", John Wiley & Sons, 11th edition, 2015.
3. James W. Nilsson and Susan A. Riedel, "Electric Circuits", Prentice Hall , 11th edition, 2018.

Periodicals :

2. "Basic Engineering Circuit Analysis", J. D. Irwin, Fourth edition, Macmillan, most recent edition.