

## 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

#### Area Of Study :

The Main Goals of this course are:

- To understand the fundamentals of electrical circuits.
- To know the main components used of electrical circuits.
- To analyze DC/AC electrical circuits using different techniques and theorems.
- To develop practical skills of testing electrical components.
- To share ideas and work in a team or a group.

#### Description :

Basic electrical quantities, Ohm's Law and Kirchhoff's Laws, resistance and source combinations, voltage and current division. Techniques of solving DC electric circuits: nodal and mesh analysis, source transformation. Theorems: Superposition, Thevenin, Norton, Maximum Power Transfer. AC sinusoidal sources, time domain and frequency domain, voltages and currents phasor diagrams, inductance and capacitance: the between voltage and current relationships, impedance and admittance, Techniques of solving AC electric circuits: nodal and mesh analysis, source transformation. Steady state power analysis is described for sinusoidal sources.

#### Course outcomes :

##### a. Knowledge and Understanding: :

1 -	By the end of this course the student should be able to: a1. Demonstrate knowledge and understanding functions of components and concepts electrical circuits including Ohm's Law, Kirchhoff's Laws, resistance and source combinations, and voltage and current division.
2 -	Illustrate solving techniques of electrical circuits including nodal and mesh analysis and source transformation.
3 -	Apply thevenin and Norton theorems to simplify circuits.
4 -	Illustrate the characteristics of inductance and capacitance.
5 -	Define the impedance, admittance, and phasors for AC electric circuits.
6 -	Illustrate solving techniques and theorems of solving AC electric circuits.

##### b. Intellectual Skills: :

1 -	b1. Ability to apply different techniques and theorems for solving electric circuits.
2 -	b2. Choose among different solution alternatives.

3 -	b3. Compare between solutions of AC and DC circuits.
<b>c. Professional and Practical Skills: :</b>	
1 -	c1. Testing electrical components.
2 -	c2. Implementation for simple electrical circuits.
3 -	c3. Applying solution techniques on simple circuits in the lab.
<b>d. General and Transferable Skills: :</b>	
1 -	d1. Work coherently and successfully as a part of a team in the Lab.
2 -	d2. Communicate effectively.
3 -	d3. Effectively manage tasks, time, and resources.

<b>Course Topic And Contents :</b>			
<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Basic concepts, components of Electric Circuits.	6	3	3
Basic laws , and voltage and current division.	12	6	6
Techniques of DC circuit analysis.	12	6	6
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

<b>Teaching And Learning Methodologies :</b>
Lectures
Tutorials
E-Learning Program.
Laboratories

<b>Course Assessment :</b>			
<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Attendance	10.00	1	to assess the attendance of the students
Final Written exam	40.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving with different techniques studied.
Laboratory Tutorials	10.00	6	to assess the ability of implementing a simple electric circuit that shows knowledge and understanding of different technical issues.
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 & Assignment 1

5.00

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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 :**

Electric Circuits", James W. Nilsson and Susan A. Riedel, Addison Wesley, most recent edition. Ramsey  
2. "Basic Engineering Circuit Analysis", J. D. Irwin, Fourth edition, Macmillan, most recent edition.

**Periodicals :**

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