

**Faculty of Engineering & Technology**

**Electrical Circuits 1**

**Information :**

**Course Code :** EPR 261

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Petroleum Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Mohamed Ahmed El Shahat Abo Saleh	4
Lecturer	Mohamed Ahmed El Shahat Abo Saleh	4
Assistant Lecturer	Rania Abdelrashid Ahmed Turkey	5
Assistant Lecturer	Rania Abdelrashid Ahmed Turkey	5

**Area Of Study :**

Develop the students' knowledge about the fundamentals and main components of electrical circuits.

Prepare students to analyze DC electrical circuits using different techniques and theorems.

Develop the students' knowledge about the characteristics of inductance and capacitance.

Prepare students to analyze AC electrical circuits using different techniques and theorems.

Develop student's practical skills on testing electrical circuits.

**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, and V<sub>Th</sub> & I<sub>sc</sub> 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<sub>Th</sub> & I<sub>sc</sub> theorem.

**Course outcomes :**

**a. Knowledge and Understanding :**

1 -	Apply V <sub>Th</sub> & I <sub>sc</sub> theorem.
2 -	Illustrate the characteristics of inductance and capacitance.
3 -	Define the impedance, admittance, and phasors for AC electric circuits.
4 -	Illustrate solving techniques and theorems of solving AC electric circuits.
5 -	Illustrate techniques for solving of DC electrical circuits including nodal and mesh analysis and source transformation.

6 -	Describe the fundamentals and main components of electrical circuits including Ohm's law, Kirchhoff's laws, resistance and source combinations, and voltage and current division.
<b>b. Intellectual Skills: :</b>	
1 -	Apply basic laws for solving simple electric circuits.
2 -	Apply different techniques for solving DC electric circuits.
3 -	Apply different techniques for solving DC electric circuits.
4 -	Apply different techniques for solving DC electric circuits.
5 -	Deduce the current and voltage phasor diagrams.
6 -	Apply different techniques and theorems for solving AC electric circuits.
<b>c. Professional and Practical Skills: :</b>	
1 -	Test electrical components.
2 -	Apply basic laws on simple circuits in the lab.
3 -	Apply theorems for solving simple circuits in the lab.
<b>d. General and Transferable Skills: :</b>	
1 -	Work coherently and successfully as a part of a team in the Lab.
2 -	Work in stressful environment and within constraints.
3 -	Communicate effectively.
4 -	Manage tasks, time, and resources effectively.

<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, 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
Inductance and Capacitance	12	6	6
Phasor and impedance	12	6	6
Techniques and Theorems of AC circuit analysis.	12	6	6

<b>Teaching And Learning Methodologies :</b>
Interactive Lecturing
Discussion
Problem solving
Report
Experiential learning

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	10.00		
Final Exam	40.00		
Lab Experiments	10.00		
Mid- Exam I	15.00		
Mid- Exam II	15.00		
Quizzes	10.00		

**Recommended books :**

J. D. Irwin and R.Mark Nelms, "Basic Engineering Circuit Analysis", John Wiley & Sons, 11th edition, 2015.

James W. Nilsson and Susan A. Riedel, "Electric Circuits", Prentice Hall , 11th edition, 2018.