

## Faculty of Engineering & Technology

### Electrical Circuits 2

**Information :**

**Course Code :** EPR 263

**Level :** Undergraduate

**Course Hours :** 4.00- Hours

**Department :** Department of Electrical Engineering

**Instructor Information :**

Title	Name	Office hours
Professor	Said Fouad Mohamed Mekhemar	
Associate Professor	Moneer Mohamed Ali Abu-Elnaga	8
Assistant Lecturer	Ahmed Moreab Hussien Mohamed	3
Assistant Lecturer	Ahmed Moreab Hussien Mohamed	3
Teaching Assistant	Shahd Muhammed Anwer Muhammed Hamed	2

**Area Of Study :**

Upon successful completion of the course, the student should be able to:

- Understand the transient performance of 1st and 2nd order circuits.
- Develop the steady state power analysis for circuits with sinusoidal sources and apply maximum power transfer theorem on AC electric.
- Understand the operation of 3-phase circuits with different connections.
- Know the performance of magnetically coupled circuits and linear transformers.
- Understand the frequency response of circuits supplied by a variable frequency sources and the concepts of resonance circuits.
- Develop practical skills of testing 1st and 2nd order circuits during transient, 3-phase circuits.

**Description :**

Transient analysis in R-L, R-C, and RLC circuits. Steady state power analysis for circuits with sinusoidal sources. Maximum power transfer theorem. Three phase circuits; connections, transformations, and power measurements. Magnetically coupled circuits: linear transformer equivalent circuits, ideal transformer. Frequency response, Series and parallel resonance circuits, Quality factor, 3 dB bandwidth, Resonance in mutually coupled circuits.

**Course outcomes :**

**a. Knowledge and Understanding: :**

1 -	a1. Demonstrate the transient performance of 1st order and 2nd order electrical circuits.
2 -	a2. Demonstrate knowledge and understanding of AC power analysis.
3 -	a3. Describe three phase circuits with different connections.
4 -	a4. Understand magnetically coupled circuits.
5 -	a5. Illustrate the frequency response of resonant circuits.
6 -	a6. Establish the equivalent circuits of different two-port networks.

**b. Intellectual Skills: :**

1 -	b1. Evaluate the transient performance of 1st and 2nd order circuits.
2 -	b2. Perform basic calculations of AC power analysis.
3 -	b3. Examine different connections of three phase circuits.
4 -	b4. Perform basic calculations of magnetically coupled circuits.
5 -	b5. Evaluate the frequency response of resonant circuits.

**c. Professional and Practical Skills: :**

1 -	c1. Develop practical skills of testing 1st and 2nd order circuits during transient.
2 -	c2. Practice basic experiments on 3-phase circuits.
3 -	c3. Test the frequency response of resonant circuits.

**d. General and Transferable Skills: :**

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.

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Transient analysis in R-L and R-C circuits.	18	9	9
Transient analysis in RLC circuits.	12	6	6
Steady state power analysis for AC circuits.	12	6	6
Three phase circuits.	12	6	6
Magnetically coupled circuits	12	6	6
Frequency response and resonance circuits.	12	6	6
Revision on Electric Circuits 1	6	3	3
Two-port networks.	6	3	3

**Teaching And Learning Methodologies :**

Lectures.
Tutorials.
E-Learning Program.
Laboratories.

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Final exam :	40.00		
o In Class Quizzes	10.00		
o Lab	10.00		
o Mid-Term exams	30.00		
o Participations	10.00		

**Recommended books :**

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