

## 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 :**

Prepare students to analyze the transient performance of 1st and 2nd order circuits.  
 Prepare students to analyze the steady state power for circuits with sinusoidal sources and apply maximum power transfer theorem on AC electrics.  
 Prepare students to understand the operation of 3-phase circuits with different connections.  
 Develop the students' knowledge about the performance of magnetically coupled circuits and linear transformers.  
 Develop the students' knowledge about the frequency response of circuits supplied by a variable frequency sources and the concepts of resonance circuits.  
 Develop student's practical skills on 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 -	Demonstrate the transient performance of 1st order electrical circuits.
2 -	Demonstrate the transient performance of 2nd order electrical circuits.
3 -	Describe steady state power in AC circuits.
4 -	Describe three phase circuits with different connections.
5 -	Explain magnetically coupled circuits.
6 -	Illustrate the frequency response of resonant circuits.

**b. Intellectual Skills: :**

1 -	Evaluate the transient performance of 1st order circuits.
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2 -	Evaluate the transient performance of 2nd order circuits.
3 -	Perform basic calculations of AC power analysis.
4 -	Analyze different connections of three phase circuits.
5 -	Perform basic calculations of magnetically coupled circuits.
6 -	Evaluate the frequency response of resonant circuits.

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

1 -	Perform experiments on 1st and 2nd order circuits during transient.
2 -	Perform experiments on 3-phase circuits.
3 -	Test the frequency response of resonant circuits.

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

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.

**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.	16	8	8
Three phase circuits.	14	7	7
Magnetically coupled circuits	12	6	6
Frequency response and resonance circuits.	12	6	6
Revision on Electric Circuits 1	6	3	3

**Teaching And Learning Methodologies :**

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		

**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.