

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	2
Teaching Assistant	Ahmed Elsayed Awad Fayed	

Area Of Study :

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

1. understand the fundamentals of electrical circuits.
2. know the main components used in electric circuits.
3. apply different techniques of solving electric circuits that operate with DC sources.
4. know the relation between voltages and currents in both time domain and frequency domain for each component.
5. apply different techniques of solving electric circuits that operate with AC sources.
6. develop practical skills of testing electrical components and applying solution techniques.
7. Share ideas and work in a team or a group

Description :

Analysis of resistive circuits by simplifications (source transformations, combination of elements, star/delta and delta /star transformations, node and loop analysis), Sinusoidal steady state analysis, Phasor diagram representation, Network theorems (superposition, Thevenin, Norton, compensation and maximum power transfer), Analysis of circuits with AC excitation in the time domain, Analysis of AC circuits in the frequency domain using complex number algebra, Application of network theorems on alternating current circuits, Electric power, Complex power calculations and power factor, Circuits with nonlinear resistances, Analysis of electrical circuits with non-sinusoidal alternating currents, Higher order harmonics.

Course outcomes :

a. Knowledge and Understanding :

1 -	Demonstrate knowledge and understanding of components and concepts electrical circuits. a2- Illustrate and describe solving techniques of electrical circuits. a3- Illustrate and describe theorems for solving electrical circuits.
2 -	Illustrate and describe solving techniques of electrical circuits.
3 -	Illustrate and describe theorems for solving electrical circuits.

b. Intellectual Skills :

1 -	Express ideas in structural and mathematic terms so that quantities evaluation is facilitated.
2 -	Ability to apply different alternative solutions.

3 -	Decide and chose among different solution alternatives.
4 -	Evaluate obtained results both individually or as a part of team.
c. Professional and Practical Skills: :	
1 -	Testing electrical components.
2 -	Implementation for simple electrical circuits.
3 -	Applying solution techniques on simple circuits in the lab.
d. General and Transferable Skills: :	
1 -	Write technical reports in accordance with standard scientific guidelines.
2 -	Work in a self-directed manner.
3 -	Work coherently and successfully as a part of a team in the Lab.
4 -	Analyze problems and use innovative thinking in their solution.

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.	12	6	6
Theorems of DC circuit analysis.	12	6	6
AC sinusoidal sources, Time domain and frequency domain	6	3	3
Inductance and Capacitance, Phasor, impedance	18	9	9
Techniques and Theorems of AC circuit analysis.	6	3	3

Teaching And Learning Methodologies :

Lectures
Tutorials
Laboratories

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Attendance	10.00	1	to assess the attendacne 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	9	to assess the skills of problem solving, understanding of related topics.

Books :

Book	Author	Publisher
Fundamentals of Electric Circuits	Alexander Sadiku	McGraw Hill

Course Notes :

No course notes are required

Recommended books :

1. "Fundamentals of Electric Circuits", C.K. Alexander and M.N.O. Sadiku, McGraw Hill, 4th edition, 2009.
2. "Basic Engineering Circuit Analysis", J. D. Irwin, Fourth edition, Macmillan, most recent edition.