

Faculty of Engineering & Technology

Electrical Circuits

Information :

Course Code : EPR 266

Level : Undergraduate

Course Hours : 4.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

Title	Name	Office hours
Lecturer	Mohamed Rizk Mohamed Elsayed Hamouda	
Teaching Assistant	Osama Ahmed Ibrahim Mohamed Montaser	1

Area Of Study :

By the end of the course the students will be able to:

- Know the different connections } and to calculate the voltage and currents in each connection.
- Develop the steady state power analysis for circuits with sinusoidal sources.
- Apply maximum power transfer theorem on AC electric.
- Understand the magnetically coupled circuits and how to get the equivalent circuits of a linear transformer.
- Understand the behavior of series and parallel resonance circuits.
- Establish the equivalent circuits of different two-port networks.

Course outcomes :

a. Knowledge and Understanding: :

1 -	Identify basic applied and engineering science.
2 -	Identify principles in the of design of mechanical components, different materials, and manufacturing technologies in the field of mechanical power engineering and some other engineering disciplines.
3 -	Identify principles in the field of design of fluid flow, thermodynamics, gas dynamics, turbo-machinery, heat transfer engineering and fundamentals of thermal and fluid processes
4 -	Develop conceptual and detailed design of construction projects and fluid power systems..

b. Intellectual Skills: :

1 -	Define the mechanical power engineering problems and evaluate designs, processes, and performance and propose improvements.
2 -	Derive different solution alternatives for the engineering problems, analyze, interpret data and design experiments to obtain new data, and evaluate the power losses in the fluid transmission lines and networks
3 -	Analyze the performance of the basic types of internal combustion engines, hydraulic machines, fluid power systems, subsystems and various control valves and actuators.

c. Professional and Practical Skills: :

1 -	Use laboratory, workshop equipment and field devices competently and safely.
2 -	Analyze the record data in the laboratory.

3 -	Prepare engineering drawings, computer graphics, and write specialized technical reports.
d.General and Transferable Skills :	
1 -	Collaborate effectively within multidisciplinary team.
2 -	Share ideas, communicate effectively and work in stressful environment and within constraints.
3 -	Lead and motivate individuals and work with others according to the rules of the professional Ethics.

Course Topic And Contents :			
Topic	No. of hours	Lecture	Tutorial / Practical
Basic concepts, components of Electric Circuits, basic laws (Ohm's law & Kirchhoff's laws)			
Resistance and source combinations. Star-Delta transformation, voltage and current division.			
Techniques: Nodal analysis.			
Mesh analysis.			
Superposition.			
Source transformation.			
Maximum power transfer theorem.			
AC sinusoidal sources, Time domain and frequency domain, and Complex numbers.			
Inductance.			
Capacitance			
Phasor, impedance and phasor diagram.			
Techniques of AC circuit analysis.			
Steady state power analysis, Power factor.			

Teaching And Learning Methodologies :
Lectures
Tutorial
Class discussions and activities
Homework and self-study

Course Assessment :			
Methods of assessment	Relative weight %	Week No	Assess What
Attendance	10.00		
Final Exam	40.00		
Lab	10.00		
Mid-Term Exam 1	15.00		
Mid-Term Exam 2	15.00		
Reports and quizzes	10.00		

Recommended books :

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