FUTURE UNIVERSITY IN EGYPT جامعة المستقبل

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:
ÅKnow the different connections } and to calculate the voltage and currents in each connection.
ÅDevelop the steady state power analysis for circuits with sinusoidal sources.
ÅApply maximum power transfer theorem on AC electrics.
ÅUnderstand the magnetically coupled circuits and how to get the equivalent circuits of a linear transformer.
ÅUnderstand the behavior of series and parallel resonance circuits.
ÅEstablish the equivalent circuits of different two-port networks.

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 -	Identifybasicappliedand engineeringscience.
2 -	Identify principles in the of design of mechanical components,differentmaterials,andmanufacturingtechnologies in the field of mechanical power engineering and some other engineering disciplines.
3 -	Identify principles in the fieldofdesignoffluidflow, thermodynamics,gasdynamics,turbo-machinery, heattransferengineering and fundamentals of thermal and fluid processes
4 -	Develop conceptual and detailed design ofconstruction projects and fluid power systems..
b.Intellectual Skills: :	
1 -	Definethe mechanical powerengineeringproblems and evaluate designs, processes, and performance and propose improvements.

2 -	Derivedifferentsolutionalternativesfortheengineeringproblems, 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 e4quipment 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 environmentand 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 (Ohmôs law & Kirchhoffôs laws)			
Resistance and source combinations. Star-Delta transformation, voltage and current division.			
Techniques: Nodal analysis.			
Mesh analysis.			
Superposition.			
Source transformation.			
Th®veninôs 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) ñBasic Engineering Circuit Analysisò, J. D. Irwin, Fourth edition, Macmillan, most recent edition.
2) ñElectric Circuitsò, James W. Nilsson and Susan A. Riedel, Addison Wesley, most recent edition.