EE 231- Electrical Circuits I

CREDIT HOURS
3 Hours

CONTACT HOURS (Hours/week)
Lecture: 2; Tutorial: 2; Lab: 2

COURSE COORDINATOR
Prof. Yasser Galal

TEXT BOOK:
J. Nilson & S.Riedel, "Electrical circuits", Prentice Hall, 2001, latest edition

COURSE DESCRIPTION:
Basic DC circuit elements. Series and parallel network. Ohm's law. 1st & 2nd kirchoff's laws. Nodal analysis. Mesh analysis. Basic network theorem; source transformation, super position, Thevenin's theorem, and Norton's theorem. maximum power transfer. Alternating current fundamentals and AC generation. R.M.S value and average value, form factor and crest factor. Phasor concept. Relation between current and voltage in resistors, capacitors and inductor. Response of RL and RC circuits. Sinusoidal response of series RLC circuit. Series resonance.

PREREQUISITE:
BA124

RELATION OF COURSE TO PROGRAM:
Required

COURSE INSTRUCTION OUTCOMES:
The student is familiar with basic elements of electric circuits, and capable of apply different methods of circuit analysis on dc circuits. The student is also introduced to AC circuits, waveforms and phasors.

TOPICS COVERED:

- Basic DC circuits elements, series and parallel networks.
- Ohm's law and Kirchhoff laws.
- Networks analysis using different methods such as node method, mesh method, source transformation method, superposition method and Thevenin and Norton Theorems.
- Determination of the suitable load which provide maximum power transfer.
- Alternating current fundamentals and generation. Calculating the average & rms values, form factor and crest factor for different waveforms.

- The relation between voltage and current in resistor, capacitor and inductor.
- Response of RLC circuits.
- Series resonance.

CONTRIBUTION OF COURSE TO MEET THE REQUIREMSNTS OF CRITERION 5:

Professional Component Content			
Math and Basic Sciences	**Engineering Topics**	**General Education**	**Engineering Design**
	✓		

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course Outcomes
a.	An ability to apply knowledge of mathematics, science, and engineering.	✓
b.	An ability to design and conduct experiments, analyze and interpret data.	✓
c.	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	
d.	An ability to function on multi-disciplinary teams.	
e.	An ability to identify, formulate, and solve engineering problems.	✓
f.	An understanding of professional and ethical responsibility.	
g.	An ability to communicate effectively.	
h.	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
i.	A recognition of the need for, and an ability to engage in life-long learning.	
j.	A knowledge of contemporary issues within and outside the electrical engineering profession.	
k.	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	✓