Zarqa University

Faculty of Engineering Technology
Department: Electrical Engineering
Course title: Electrical circuits (0904200)

Prerequisite: 0300122
Instructor: TBD
Lecture's time: TBD
Semester: TBD
Office Hours: TBD

Course description:

Basic Electric Components and Equivalent Circuit. Kirchhoffs' laws (KVL and KCL). Circuit analysis techniques: Nodal analysis, mesh analysis, superposition, source transformations. Thevenin's and Norton's theorems, maximum power transfer. Unit step response of RL and RC circuit.AC circuit introduction.Impedance and Admittance. Phasor form representation. Steady state sinusoidal circuit analysis using phasor techniques, frequency response. Apparent Power , active and reactive power, power factor, complex power. 3-phase balanced (Y-Y) and (delta-delta) connection circuits. Circuit analysis using Fourier series

Aims of the course:

1. To be familiar with using Ohm's law and the calculations of power, analyze series, parallel and series-parallel resistive circuits, using Kirchhoff's current and voltage laws

2. The ability to use the different circuit analysis methods: mesh current analysis and node voltage analysis.

3. The ability to simplify circuits using circuit theorems, such as: Thevenin and Norton theorems, super position principle, and source transformation.

4. The ability to analyze the behavior of inductors and capacitors and the step response ofR-L and R-C circuits

5. To be familial with Sinusoidal wave characteristics, connection and types, complex numbers, phasor representation and analyze frequency response of R-L, R-C and R-L-C circuits.

6. The ability to analyze the complex power and power factor.
7. To be familiar with the basic concepts of 3-phase systems.
8. Analyze ac circuit using Fourier series.

Course structures:

Week (s)	ILOs	Topics	Teaching Procedure	Assessment method
1-2	1	Ohm's law, DC power calculation, series, parallel and series-parallel resistive circuits, Kirchhoff's current and voltage laws	PPT lectures and text book	HWs and Quizzes
3-4	2	Circuits analysis methods : Nodal and mesh analysis	PPT lecturesand textbook	HWs and Quizzes
5-6	3	Circuit theorems: Thevenin's , Norton's , source transformation , super position theorems and maximum power transfere	PPT lecturesand textbook	HWs and Quizzes
7-8	4	Inductors , capacitors , step response of R-L and R-C circuits	PPT lecturesand textbook	HWs and Quizzes
9-10	5	Introduction to AC circuits, phasor representation, and steady state AC circuit analysis	PPT lecturesand textbook	HWs and Quizzes
11-13	6	AC power analysis: average power, apparent power, reactive power, complex power and power factor	PPT lecturesand textbook	HWs and Quizzes
14	7	3-phase balanced circuits: Y-Y and delta-delta connections	PPT lecturesand textbook	HWs and Quizzes
15-16	8	AC circuit analysis using Fourier series	PPT lecturesand textbook	HWs and Quizzes

Textbook

" "Fundamentals of electrical circuits " by Charles K. Alexander and Matthew N.O. Sadiku. 5th edition.

References:

" "Engineering circuit analysis ", by William H. Hayt,, Jack E. Kemmerly and Steven M. Durbin. 8th edition
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Assessment Methods:

Methods	Grade	Date
Test 1	20	To be assigned
Test 2	20	To be assigned
Assignment + Quizes	10	As given in the course structure
Final Exam	50	To be assigned