The University of Jordan
School of Engineering
Department of Electrical Engineering
1st Semester – A.Y. 2015/2016

Course: Electric Circuits Lab – 0903219 (1 Cr. – Core Course)

Instructor: EE faculty Members
Office:, *Telephone:* 5355000 ext, *Email*:

Course Website: `http://www.hawa.work/courses/219`

Catalog Data: DC circuits. KVL. Network theorems. Transient analysis in RL, RC, and RLC circuits. Impedance concept. Power and P.F. Series and parallel resonance. Quality factor. Three phase circuits. Power measurement. Parameters of two-port networks. Coupled circuits. Filters

Prerequisites by Course: EE 0903212 – Electric Circuits (2) (co-requisite)

Prerequisites By Topic: Students are assumed to have sufficient knowledge pertaining to the following:
DC and AC Electric Circuit Analysis.

Textbook: **Lab Manual which can be obtained from the course Website**

References:
- *Engineering Circuits Analysis* by Kemmerly Hayt and Durbin. 7th Edition. McGraw-Hill.
- *Shaum's outline of Electrical Circuits,* Research & Education Association, 1st Edition, 1998.
- *Electric Circuits Problem Solver (Problem Solved Solution Guides),* by Nilsson Riedel, McGraw-Hill, 5th Edition, 2011
- Fundamentals of Electric Circuits, by Charles Alexander and Matthew Sadiku, McGraw-Hill, 3rd Edition, 2012.

Schedule & Duration: 16 Weeks, 10 Labs (3 Hours each) plus exams.

Minimum Student Material: Experiments Manual, class handouts, scientific calculator, and access to a personal computer.

Minimum College Facilities: Lab with proper equipment and measuring instrumentation facilities.

Course Objectives: The main objective of this lab is to allow the student to perform a set of experiments needed to validate different circuit theorems and to utilize some basic measurement instruments such as multimeters and the oscilloscope.

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should:

1. Perform fundamental measurements on electrical circuits. [b,d,g,k]
2. Use basic electrical laboratory instrumentation. [b,d,g,k]
3. Write complete technical reports. [b,d,g,k]
4. Know basics of electronic circuit instrumentation, including multimeters, power supplies, function generators and oscilloscopes. [b,d,g,k]
5. Know format and content requirements for complete technical reporting. [b,d,g,k]

Course Topics:

	Topic Description	Hr
1.	**Measurement Devices**: Familiarization with the main devices and equipment used in the Lab, including: multimeters, oscilloscopes, power supplies, function generators and breadboards. A simple circuit is connected, and basic measurements are made.	**3**
2.	**Resistors and DC Circuits**: Identification of resistor values by color coding, and recognizing the different resistor types. Testing different DC circuit analysis techniques, including parallel/series combinations, voltage/current division (using resistive networks), and nodal/mesh analysis.	**3**
3.	**Network Theorems**: Verify superposition theorem. Examine both the Thevenin and Norton theorems. Investigate the conditions for maximum power transfer in DC circuits. Learnt about adjustable resistances, namely the potentiometer and rheostat.	**3**
4.	**Transient Analysis**: Learnt how to read the values of capacitors and inductors from their number or color codes. Test the transient behavior when charging and discharging a capacitor, and the transient behavior when energizing and de-energizing an inductor. Learn how to use an oscilloscope to display and measure various waveforms.	**3**
5.	**Inductive Reactance:** Examine the relationship of inductive reactance to the AC source frequency. AC power and power factor calculations are introduced.	**3**
6.	**Capacitive Reactance:** Investigate the relationship of caapctive reactance to the AC source frequency. AC power and power factor calculations are performed.	**3**
7.	**Resonance**: Investigate the voltage and current relationships in series and parallel resonant RLC circuits. Determine the resonant frequency and the quality factor of the circuit with relation to the values of the R, L, and C components.	**3**
8.	**Delta-Wye Conversion**: Investigate the Δ-Y and Y-Δ impedance conversion, and how this can be used to simplify the analysis of DC and AC circuits	**3**
9.	**Transfer Function of Two Port Networks:** Investigate the transfer function of several two-port networks including: low-pass filter (LPF), high-pass filter (HPF) and bandpass filter (BPF).	**3**
10.	**Home Wiring Basics**: Introduce some basic principles that everyone should know about residential wiring, lighting, electrical installation and safety.	**3**

Ground Rules:

Attendance is required and highly encouraged. To that end, attendance will be taken every lecture. All exams (including the final exam) should be considered **cumulative**. Exams are closed book. No scratch paper is allowed. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes.

Assessments:

Exams, Quizzes, Reports, Projects, and Assignments.

Grading policy:

Pre-Lab Reports	**3 %**
Lab Reports	**10 %**
Quizzes	**13 %**
Team Work	**4 %**
Midterm Exam	**30 %**
Final Exam	**40 %**
Total	**100%**

Last Updated:

January 2016