

The University of Jordan
School of Engineering
Electrical Engineering Department
2nd Semester – A.Y. 2020/2021



Course: Electrical Engineering Lab – 0903204 (1 Cr. – Required Course)

Instructor: Dr. Sereen Al-Thaher + Eng. Sana Khawaldeh
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Office Hours: Will be posted soon

Course website: <http://engineering.ju.edu.jo/> (Go to Electrical Engineering Department Labs)

Catalog description: Electric measuring equipment. DC circuits. Basic Laws and network theorems. Impedance concept and phase shift in RL and RC circuits. Three-phase wye and delta connected loads. Measurement of power and power factor. Transistor amplifiers. Operational amplifiers (Op-Amps).

Prerequisites by course: EE 0903203 Electrical Engineering (pre-requisite)

Prerequisites by topic: Students are assumed to have a background in the following topics:
• DC electric circuit analysis.
• AC electric circuit analysis.

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

- References:**
1. Principles and Applications of Electrical Engineering by Giorgio Rizzoni and James A. Kearns, McGraw-Hill Education, 6th edition, 2015.
 2. Fundamentals of Electric Circuits by Charles K. Alexander and Matthew Sadiku, McGraw-Hill Education, 6th edition, 2016.
 3. Black & Decker The Complete Guide to Wiring by Editors of Cool Springs Press, 7th edition, Cool Springs Press, 2017.
 4. Electrical Wiring Residential by Ray C. Mullin and Phil Simmons, 19th edition, Cengage Learning, 2017.
 5. Basic Electrical Troubleshooting for Everyone by Darrel P. Kaiser, Darrel Kaiser Books, 1st edition, 2012.
 6. Everything Electrical How To Test Circuits Like A Pro Part 1 by Vincent Keler, Independently published, 1st edition, 2018.
 7. Beginner's Guide to Reading Schematics by Stan Gibilisco, 4th edition, McGraw-Hill Education, 2018.

Schedule: 16 Weeks, 10 Lab sessions (3 Hours each) plus exams.

Course goals: The overall objective is to allow the student to perform a set of experiments to validate different circuit theorems, to examine the practical details and characteristics of various electronic components, and to utilize some basic measurement instruments such as multimeters and the oscilloscope.

Course learning outcomes (CLO) and relation to ABET student outcomes (SO):

	[SO]
Upon successful completion of this course, a student will:	
1. Be able to conduct appropriate experimentation to measure fundamental electrical parameters (including voltage, current, power, frequency, etc) in electrical and electronic circuits, and validate the fundamental theories related to such circuits.	[6]
2. Be able to analyze and interpret measured data, and use engineering judgment to draw conclusions.	[6]
3. Know the basics of electrical laboratory instruments (including multimeters, power supplies, function generators and oscilloscopes) and be able to properly use such instruments.	[6]
4. Understand the requirements and pre-requisites for technical reporting, and be able to properly report experimental results.	[3]
5. Be able to effectively function in a team in a collaborative and inclusive manner, to reach the lab goals and objectives.	[5]

Course topics:	Hrs
1. Resistors and DC Circuits: Identification of resistor values by color coding. Testing different DC circuit analysis techniques, including parallel/series combinations, voltage/current division (using resistive networks), and Ohm's and Kirchhoff's Laws.	3
2. Network Theorems: Verify superposition theorem. Examine both the Thevenin and Norton theorems.	3
3. The function generator and oscilloscope: Generate different sinusoidal waveforms. Compute and measure V_{p-p} , V_p , V_{avg} , and V_{rms} . Measure the period and frequency of periodic AC signals.	3
4. Transient Analysis: Series RC and RL circuits under variable frequency AC excitations.	3
5. Transient Analysis: Parallel RC and RL circuits under variable frequency AC excitations.	3
6. Resonance: Steady-state characteristics of series R-L-C circuit under sinusoidal excitation.	3
7. Diode Characteristics: basic properties of diodes, i-v curve.	3
8. Diode Rectification: comparison of half wave and full wave rectification.	3
9. Bipolar Junction Transistor Characteristics: Basic properties of the BJT transistor, BJT transistor characteristic curves in the common emitter configuration.	3

Ground rules:

Attendance is required and highly encouraged. To that end, attendance will be taken every lab session. Eating and drinking are not allowed during the lab, and cell phones must be set to silent mode. 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.

Assessment & grading policy:

Assignments	0%	Quizzes	15%
First Exam	0%	Projects	0%
Midterm		Lab	
Exam	30%	Reports	15%
Final Exam	40%	Teamwork	0%
		Total	100%

Last Revised:

March 2021