Department of Physics

College of Science

University of Salahaddin-Erbil

Subject: Electrical measurements Laboratory

Course Book- (Year2)

Lecturer's Name:

Dr. Goran Muhammad Khalil

Dr. Herish Ahmed Khizir

Academic Year: 2023/2024

First & Second Semesters

Course Book

1-Course Name	Electrical Measurements Lab.
2-Lecturer in charge	Goran Muhammad Khalil & Hersh A. Khizir
3-Department/ College	Physics/Science
4-Contact	E-Mail: hersh.khizir@su.edu.ked Tel: (Optional)
5-Time(In hours) per week	Practical : 2
6-Office Hours	wednesday8:30 to 11:30
7- Course Code	
8- Teacher's academic profile	Name: Hersh A. Khizir Education: 2000-2004: BSc. Degree in Physics 2010: MSc. Degree in solid state I taught the following materials: 1. Physics for chemist 2. Mathematical Physics 3. General Physics. I have four published papers they are available on my researchgate site : https://www.researchgate.net/profile/Hersh_Khizir
9- Keywords	Electrical circuit analysis

10- **Course Overview:**

Electrical measurements lab. is one of three necessary subject required for the second year physics BSc. Degree stage, beside Atomic and thermodynamics lab. They all constitute an independent subject called practical physics with six units for the academic year.

The subject includes different topics about the practical skills in electricity which can be considered as preparing stage for the third year electronics lab. subject, meanwhile to make the student professional in using different electrical measuring tools especially the cathode ray oscilloscope.

11- **Course Objective:**

The object of Electrical Measurements Lab is to give the students practice using some of the basic test instruments used in a physics laboratory such as the voltmeter, ammeters, and oscilloscope and acquaint the student with:

1) electrical measuring techniques
2) Instruments & procedures for electric test & measurement

12- **Student's obligation**

In general, students should not turn on their equipment until their circuit has been checked by the instructor. The laboratory outlines and lectures will give details on the way in which circuits are to be connected and the colour codes to be followed. Normally, red will indicate the positive side of the circuit and black the negative side. Positive current will be used throughout, i.e., current flowing from the positive.

The labs are three hours in length. Since some of the experiments require less than the full 3 hours, students are urged to ask questions about the course
and/or write up their lab report in the remaining time. Use the Lab manual worksheet as a resource during this period of time

A late penalty of 1.5 marks per day will be assessed to reports handed in late.
The marking of the lab should be completed for the next lab period.

13- **Forms of Teaching**

Different forms of teaching will be used to reach the objectives of the course: Experiment work sheet is designed to make student able to prepare for the experiment setup before entering the laboratory. There will be power point presentations for the head titles, definitions and, summery of conclusions. Also, there will be lab seminar discussions, and different issues will be discussed throughout the academic year.

14- Assessment scheme

The students are required to do two experimental examinations at the mid, and the end of the academic year respectively, besides other assignments including lab report preparation, seminars, and quizzes. The two exams have (13marks), the other activities as mentioned above count 10 marks. There will be a final experimental exam on 20 marks, so that the final grade will be 33. The total marks for practical physics (Atomic + thermodynamics + Electrical measurements lab. is (33+34+33=100).

15- **Student Learning Outcome:**

The object of Electrical Measurements Lab is to give the students practice using some of the basic test instruments used in a physics laboratory such as the voltmeter, ammeters, and oscilloscope and acquaint the student with:

1) electrical measuring techniques
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16- **Course Reading list and References:**

- The core materials of the subject consists of the lab worksheet, articles from media and internet, and lecture's notes, make sure you read all the materials and prepare well before going for the exams

17- The Topics	**Lecture's Name**
	Lecture's Name Ex:(2 hr)
18-Practical Topics (if there is any)	
Electrical Measurements Lab. **Three hours per week** **List of experiments for the first semester:** **1) Some measurements using cathode ray oscilloscope (CRO)** **a) measurements of a DC voltage** **b) measurements of AC voltage** **c) to verify the relation between maximum voltage Vm and the root mean square voltage (Vrms)** **2) a) Calibration of the frequency of AC signal** **b) Determination of the frequency of unknown signal by Lssajous figures** **3) To determine the value of unknown resistance (), capacitance © and inductance (L)**	Lecturer's name Ex: (3-4 hrs)

4) **Maxwell bridge to determine inductance (L) and resistance (R)**

5) **Damping factor in electrical resonance circuit**

6) **To study the charging and discharging of a capacitor through a resistance**

7) **RC filter high pass and low pass**

8) **Differentiating and integration**

List of experiments for the second semester:

1) **The Volt-Ampere characteristics of a semiconductor diode**

2) **The Volt-Ampere characteristics of a Zener diode**

3) **Halve wave and full wave rectifier circuits**

4) **Clipping circuits**

5) **Clamping circuits**

6) **Doubling voltages**

7) **Thevinin's and Norton's theorems**

19- **Examinations:**

1-***Compositional***: in this type of exam the questions usually starts with Explain how, what are the reasons For….?, Why….?, How….?
With their typical answers
Examples should be provided

2- ***True or false type of exams***:

In this Type of exam a short sentence about a specific subject will be provided, and then students will comment on the trueness or falseness of this particular sentence. Examples should be provided

3-***Multiple Choices***:
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20- Extra notes:
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21-Peer Review
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