Department of Physics

College of Science

University of Salahaddin-Erbil

Subject: Electricity and Magnetism

Course Book – (Year 1)

LECTURERS:

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Dr.Abdullah O.Hamza

M.Sc. Safa Ghazi Hameed

Academic Year: 2021/2022

Course Book

1. Course name	**Electricity and Magnetism Lab.**
2. Lecturer in charge	**M.Sc. Safa Ghazi Hameed**
3. Department/ College	**Physics / Science**
4. Contact	**e-mail:** safa.hameed@su.edu.krd
5. Time (in hours) per week	**Theory: 2**
6. Office hours	**To be Return to the schedule on the office door**
7. Course code	
8. Teacher's academic profile	**Three** teachers are teaching in **Electricity and Magnetism Lab.**.
9. Keywords	Electricity, Concepts of Electricity and Magnetism Lab.

10. Course overview:

The objective of this course is to teach electricity and magnetism (E&M) by observations from experiments. This approach complements the classroom experience of Physics, where students learn the material from lectures and books designed to teach problem solving skills. Historically, E&M evolved from many observations that called for a theoretical explanation. This laboratory course is designed to perform experiments showing the validity of theoretical equations.

This laboratory consists of two courses, each course have different experiments explain the concepts of Electricity and Magnetism and will introduce students to the foundations of practical physics experimentally, therefore the course is intended to cover some of the standard concepts in electricity and magnetism physics, namely, electrical circuits, resistors combinations and so on. The course aims to lay the foundational concepts for students who would take up

11. Course objective:

Student learning outcomes:

- Better understand physics concepts covered in lecture by seeing their application in experiments.
- To understand the importance of experiment as the basis of the scientific method.
- To obtain experience in the techniques employed by scientists in all fields for analysing data and drawing conclusions from "real world" experiments.
- Report there results in a scientific fashion.

12. Student's obligation

It is expected that the students interact a lot and ask questions. This will help to be more efficient when conducting the lab and writing the lab report.

For the remaining 3h the students will conduct the experiments and start the data analysis. Students should pay close attention to the instructions of the teacher and the lab manual. Careful experimenting will result in better data. If something is unclear the teacher is ready to help.

Every lab is 3h long. Students are expected to be on time and they are expected to stay until the end of the lab and to not leave early. If you finish early work on the lab report.

Nobody should leave without the teacher signing your data.

13. Forms of teaching

Each student make one experimentally separately and take data then solved mathematically and graphically then compared with theoretical data, after that in next week they make report of their experiment and discussed physically.

14. Assessment scheme

In this way every week they make eight experiment for each course. At the end of each course the students are required to do an examinations.

There will be final exam on 20 marks so that the final grade will be based upon the following criteria:

Mean of the two exams: 14%, for this lab. Because there are another two lab.(Thermodynamic and Electrical Measurement)

Final exam: 20%

15. Student learning outcome:

Format of Report:

The idea of the report is that you could go back to report in a few months and would be able to repeat the measure ments without any further instructions only using your report.

Start with writing the experiment’s title and your partners' name/s.

Objectives:

The purpose of the lab. The objective part should be very short; it should not be longer than two or

three lines. Write it in your own words.

Notes:
Write and explain any derivations of formulas you used in this experiments as well as assumptions we made to modify these formulas. (These are not the lecture notes!)

Procedure:
Students may asked to write in their own words each step of your experiment. Do not copy the procedure from the lab manual. Draw a sketch of any apparatus and label the different components used in this experiment.

Data input:
Will include tables, graphs (Before printing any graph ask your TA to check the plot), and charts properly labelled with units. Please tape all extra papers to your notebook. The data should contain the information that was given and measured during the experiment (radii, current, voltage, resistance, etc.).
Write units for all physical quantities. Not using unit's results in a deduction of points for your lab report.

Calculations:
Transform your data into results. Do not erase.
Write the formulas you are going to use in your calculation, explain what that formula for is, and then use it.
Calculate error propagation.
Write unitsfor all physical quantities. Not using units results in a deduction of points for your lab report.
Final Results:
Write all your final results as follows: result ± uncertainty. Every measurement that you take has to be given with an error. Giving a measurement without the uncertainty has no physical meaning. Write units for all physical quantities. Not using units results in a deduction of points for your lab report.

Discussion of errors:
Discuss the systematic and statistical errors involved in your experiment.

16. Course Reading List and References:

A complete course in ISC physics by V.P.
Bhatnagar Pages 267, Pitambar Publishing, 1997.
Practical physics by P.R Sasi Kumar, PHI Learning Pvt. Ltd, 1995.

17. The Topics:	**Lecturer's name**

Both Courses	
ohms law	
Kirchhoff's Laws	
the resistivity of the material of a wire using whetstones bridge	
A sample graphical method for both the e.m.f. and the internal resistance of cell	
To show that behavior of an inductance in an a.c. circuit is analogous to that of a resistor which obeys ohms law, and hence to measure inductance	
L-C-R series and parallel resonance	
LC Circuits	

RL Circuits	
RC Circuits	
Resistors in Series & Parallel	
Experiments with a deflection magnetometer to investigate how the magnetic flux density due to the current varies with the current.	
20. Extra notes: *:*This syllabus may be subject to changes, i.e. we may take either longer or shorter time to finish a topic, if any changes happened you will be notified well in advance.	
21. Peer review	