

Ministry of Higher Education and Scientific research



Physics department

College of Education

Salahaddin University-Erbil

Subject: Electricity & Magnetism Lab.

Course Book – (First Year Student)

Lecturer's name: Avan Haydar Farhan

Academic Year: 2023/2024

Course Book

1. Course name	Electricity & Magnetism Lab.
2. Lecturer in charge	Avan Haydar Farhan
3. Department/ College	Physics, Education
4. Contact	e-mails: avan.farhan@su.edu.krd
5. Time (in hours) per week	
6. Office hours	Thursday: From 8.30 To 2.30 Wednesday: From 8.30 To 2.30
7. Course code	
8. Teacher's academic profile:	I was born in Erbil, Kurdistan Region-Iraq, in 1989. I received the B.Sc. degree (First Class) in Physics from Salahaddin University-Erbil, in 2012, the MSc. degree (First Class) in Material Science from Salahaddin University-Erbil, in 2018. My I became an assistant physicist with the physics department, where I worked in the Mechanics Lab, Electricity and Magnetism Lab, General Physics Lab, Advanced Electricity and Magnetism Lab, Electronic Lab, Nuclear Lab, Illustration Lab, Computer Skills Lab, Electricity and Magnetism, Properties of Matter, Advanced Electricity and Magnetism, Computer Skills, Laser Physics, and General Mathematics.
9. Keywords	
10. Course overview:	The course aims at introducing phenomena and the fundamental principles of Electricity and Magnetism using the mathematical skills (especially vector calculus) you learnt from other courses. Emphasis is put on both the understanding of the physical meanings of the mathematical descriptions. Moving magnets can induce electric currents, and electric currents can cause magnetism. Based on this statement, there is

obviously a close relationship between electricity and magnetism.

Electric current flowing in a wire creates a magnetic field around it. This magnetic force is evidence of the phenomena known as electromagnetism. Examples will be provided both in class and in homework so as to help you acquire the analytical skills. Some computer skills of doing symbolic calculations will also be introduced. Mini-projects and their presentation allow you to have an in-depth and collaborative exploration of selected topics beyond the scope of the lectures.

11. Course objective:

Understanding electricity and magnetism laboratory is both a basic aspect of physics and very important in view of its increasing technological importance. The aim of the course is to develop a sound understanding of the basic concepts of electricity and magnetism laboratory. The course will give the students a better understand of a number of topics, such as the existence of different physical states of matter and the degree to which matter can be stretched and compressed when forces are applied, and other phenomena involving macroscopic properties include the manner in which fluids flow explained using experimental observations and (large-scale) theories. Surface tension in liquids in explained using a molecular level theory.

12. Student's obligation:

Students must be **on time** for class and should **refrain** from leaving and **re-entering** the classroom during lecture. If a student has a **legitimate** reason for being **excused** early from class, then **he** or **she** should discuss this with **me** before class.

Cell **phones** may **not** be used during **class** (no texting) and should be **silent**. **Laptops** may not be used for anything other than taking **notes**. It is important that you refrain from **excessive** talking during lecture as a **courtesy** to your fellow students.

13. Forms of teaching:

Different forms of teaching will be used to reach the objectives of the course , power point presentations for the head titles and definitions, and all subjects detail including the equations and some solved problems, also student can get copy of lectures before time of lecture by a few days in order to knowing background and making preparing themselves about the subjects, so that resulting an active way to understanding, beside that the important notes and complicated equations will explained on white board.

To get the best of course, it is suggested that you attend classes as much as possible, read the required lectures, teacher's notes regularly as all of them are foundations for the course. Lecture's notes are not for supporting and not for submitting the reading material including the handouts. Try as much as possible to participate in classroom discussions, preparing the assignments given in the course.

14. Assessment scheme:

Attaining the **requirements** set to succeed in this study subject requires developing a **mathematical** sense, related to this topic, based on emergent analytical and problem-solving skills and memorizing topics cannot secure success.

In this system the **maximum** mark is **(25%)**. The grading system is based on the summation of two categories of **evaluations**:

First, (10%) of the **mark** is based on the **academic** year effort of the student which includes:

- **6%** Do Make Experiments Weekly.
- **4%** for Quizzes and Laboratory Participation.

Second, (15%) of the **mark** is based on **final** examination that is comprehensive for the whole of the study material **reviewed** during the **academic year** and it usually occurs during the month of **May**

15. Student learning outcome: The due dates for submitting the homework assignments are one week from the date of assignment. No late submission will be accepted.

Your problem solutions must include the detailed steps (not just the final answer):

- (a) A diagram, where appropriate,
- (b) Symbolic identification of the given and unknown quantities,
- (c) Identification of the definition, concept, or law used to solve the problem,
- (d) Algebraic solution of the problem.

Important - correct final answer without the required steps will not be awarded full marks.

Your work must be neat and well organized.

Some organizational tips:

- Write your name in capital letters, so that you will be credited for your homework
- If you use lined paper, use alternate lines. Otherwise, the work is too cramped and difficult to read.
- Write on one side of the paper only.
- Start each problem on a new sheet of paper. This allows you to easily amend your work and to not get stuck with the need to squeeze lots of material into a small space. Allow for margins at the top, bottom and sides of the page.
- Number your pages and staple your work together prior to submission.

Working in groups is a valuable way to learn physics, but the work you submit for grading must be your own.

16. Course Reading List and References:

Required book:

- 1- A Text book of Electrical Technology, by B.L THERAJA and A.K.THERAJA, 1st Multicolor Edition 2005.
- 2- "University Physics", 2008, by Sears and Zemansky's, 12th edition,

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17. The Topics:	Twana Kak Anwer
<p>1st Semester:</p> <p>8 Weeks</p>	<ol style="list-style-type: none"> 1. Information about the Electric Device on this Laboratory 2. Investigation Ohm's Law 3. A Simple Graphical Method for Determining the Resistance of a Voltmeter 4. A Simple Graphical Method for Determining Both the e.m.f. and the Internal Resistance of a Cell 5. Maximum Power Transfer Theorem
<p>2nd Semester:</p> <p>7 Weeks</p>	<ol style="list-style-type: none"> 6. The Oscilloscope 7. Measurement Inductance of the Coil 8. Measurement Capacitance of the Capacitor 9. Resonance Circuit
<p>19. Examinations: Different types of questions will be provided to the student as an exercise and also in examinations such as given them in the question banks which contain each of the following ones:</p> <ol style="list-style-type: none"> 1. Mathematical derivation and explanation questions for different subjects in calculus are provided. 2. Mathematical calculation questions for different algebraic and analytical calculus subjects also given to them. 3. Multiple choices questions for every subject that are given in calculus topics are also provided to them. 4. Finally, the true and false questions are also given to them for several mathematical subjects. 	

Each of these mentioned question types will be seen clearly in the question banks that are given to the quality assurance committee of our physics department.

20. Extra notes:

Due to a number of **unforeseen** reasons that may lead to the **shifting** of the academic year **program**, it may be subjected to **modifications**. Also, extra **curriculum** hours may be **needed** to cover all the **topics** mentioned above. The students shall be **notified** of the **changes** if and when they may **occur**.

21. Peer review