



Department of Physics

College of Education

University of Salahalddin - Hawler

Subject: Advanced Electricity & Magnetism

Course Book – (Year 2)

Lecturer's name: Assistant prof. Gulala Mohamad Faraj

Academic Year: 2022/2023

Course Book

1. Course name	Advanced electricity and magnetism
2. Lecturer in charge	Assistant. prof: Gulala Muhammad Faraj
3. Department/ College	Department of Physics /College of Education
4. Contact	e-mail: gulala.faraj@su.edu.krd Tel: (07504493444)
5. Time (in hours) per week	For example, Theory: 2 Practical: 2
6. Office hours	Sunday from 8:30-11:30 or making Appointment
7. Course code	
8. Teacher's academic profile	<p>Undergraduate Study: 1991-1995.</p> <p>Physics Assistant: 1995-2002</p> <p>MSc Study 2002-present</p> <p>lecturer Assistant: 2002-2010</p> <p>lecturer: 2010-2017</p> <p>Assist prof. :2017-present</p> <p>Teaching: practical physics :(electricity lab. +mechanics lab+ atomic lab + advanced electricity and magnetism lab. Electricity lab. General physics lab.</p> <p>Theory: Electricity and magnetism (first stage), advanced electricity and magnetism, and, general physics.</p>
9. Keywords	Electric Circuits, Kirchhoff's Laws, circuit Analysis Methods, The venin's Theorem, Q-Factor, Resonance, Rectifiers, Transformer, AC circuit and ,....

10. Course overview: The course aims at introducing phenomena and the fundamental principles of Electricity and Magnetism using the mathematical skills (especially vector calculus) students 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: The objective of this course is for students to gain a basic understanding of the physics behind electric and magnetic fields, the forces they exert on charged particles, and some applications of these fields and forces to practical problems. It is also:

- Obtain a comprehensive understanding of the fundamental concepts in electricity and magnetism.
- Obtain a complete knowledge of the fundamental laws of electricity and magnetism.
- Obtain analytical skills for solving problems in Electricity and Magnetism to reinforce conceptual understanding.
- Understanding how the AC principle network works and separating that principle with one of DC current.
- Understanding the mathematics and principles of how electrical generators work.

Good understanding of magnetism and electromagnetic waves.

12. Student's obligation The Importance of Having Class:

- Students should come to class because there's a lot that I'll say may not be found in the Power Point files, and which may be a part of exams and the quizzes.
- In the past, people who have skipped a lot of classes have received very low marks. Conversely, people who have come to most or all of the classes nearly always receive good grades.

- Making a direct contact with their teachers.
- Keep the classroom rules in tight.
- Doing their homework.
- Preparing for a 5 min quiz.
- Passing from the exam (passing grade is 50%)

Making appointment or using the office hours to ask for what they didn't understand throughout the class time.

13. Forms of teaching

We are going to use data show as a main source of showing materials on screen including figures, data, charts, equations, and whiteboard is also going to be used to explain some critical points. We also have activities during the classes such as asking students remembering materials that they have taken from the previous lectures. We also conclude the taken materials in 5 min at the last moments of each class and also giving student's homework

14. Assessment scheme the overall passing grade is 50%. This overall mark is divided into three main sections as below:

Midterm Exam 40% (Closed Book)-1 hr exam

Final Exam 50% -3 hrs. exam

15. Student learning outcome:

We tend to clarify our outcome, effort, which we have spent to complete the teaching process successfully. Students must/or how:

- Understood the main and key points of the course, such as, how AC circuit works, and how the mathematics is related to.
- Make connection between the taken materials and daily life applications.
- Brainstorm / making plans to bring his/her self-innovations in the future.

16. Course Reading List and References: Course Reading List and References:

1. "A Text book of Electrical Technology", 2005, by B.L Theraja and A.K.Theraja, 1st Multicolor edition.
2. "Introductory Circuit Analysis", 2008, by Boylestad, 3rd edition.
3. "Fundamental Electrical and Electronic Principles", 2008, by Christopher R Robertson, 3rd edition, Elsevier Ltd. All rights reserved.

4. "University Physics with Modern Physics", 2008, by Young and Freedman, 12 th edition.	
17. The Topics:	Lecturer's name
<u>Week 1 and 2</u> : CHAPTER ONE Circuit Laws	13/9/2022 and 20/9/2022
<u>Week 3 and 4</u> : CHAPTER TWO Analysis Methods	27/9/2022 and 4/10/2022
<u>Week 5 and 6</u> : CHAPTER THREE Network Calculations	11/10/2022 and 18/10/2022
<u>Week 7, 8</u> : CHAPTER FOUR A.C. Fundamentals	25/10/2022 and /1/11/ 2022
Week 9: review	8/11/2022
Week 10: exam (20%) 3hr	15/11/2022
<u>Week 11 , 12 , 13 and 14</u> : CHAPTER FIVE Magnetism	22/11/2022 and 29/11/2022 and 6/12/2022
<u>Week 15 , 16 , 17 and 18</u> : CHAPTER SIX Electromagnetism	10/1/2023 and 17/1/2023 and 24/1/2023 and 31/1/2023

<p><u>Week 17</u>: review</p> <p><u>Week 18</u>: exam (20%) 3hr</p> <p><u>Week 19 ,20 and 21</u>: CHAPTER SEVEN Electromagnetic induction</p> <p><u>Week 22, 23</u> : CHAPTER EIGHT Series AC. Circuit</p>	<p>7/2/2023</p> <p>14/2/2023</p> <p>21/2/2023 and 28/2/2023 and 7/3/2023</p> <p>28/3/2023 and 4/4/2023</p>
<p>18. Practical Topics (If there is any) In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the</p> <p>Lecture</p>	<p>Lecturer's name</p> <p>ex: (3-4 hrs)</p> <p>ex: 15/11/2022</p>
<p>19. Examinations: <i>1. Definitions: example (define the following items: 1 Reluctance 2. Q-Factor)</i></p>	

<p>2. <i>Solving problems: (example: What is the voltage V_s across the open switch of the</i></p> <p><i>below figure?-the figure will be given to students)</i></p> <p>1. <u>Multiple choices:</u> <i>Example:</i> (right the best answer of the following questions)</p> <p>2. <u>Mathematica derivation</u></p> <p>3. <u>Complete the following phrases:</u> <i>Example:</i></p> <p>4. <u>Drive:</u> (example: prove $f_0 = 1/(2\pi LC)$)</p>	
<p>20. Extra notes:</p> <p>Here the lecturer shall write any note or comment that is not covered in this template and he/she wishes to enrich the course book with his/her valuable remarks.</p>	
<p>21. Peer review</p>	<p>پیداچونہو دی ہاوہل</p>