هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	Electromagnetism Lab
Course Code:	PHYS 394
Program:	B.Sc. in Physics
Department:	Department of Physics and astronomy
College:	College of Science
Institution:	King Saud University
Version:	2.0.0
Last Revision Date:	Sep 2023

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	**2(0+0+4)**				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	5th level / third year.				
4. Course general Description Experiments will be performed by the students: Transformers, Resonance in RCL series circuits, Measuring the magnetic field of circular conductor loops (Biot-Savart's law), Determination of the charge to mass ratio for the electron (e/m) using Thomson tube, Determination of dielectric constant using RCL resonance circuit, Millikan experiment, Measuring the earth's magnetic field with a rotating induction coil, Measuring the induction voltage in a conductor loop moved through a magnetic field.					
5. Pre-requirements for this course (if any): PHYS 221					
6. Co- requirements for this course (if any):					
7. Course Main Objective(s) 1. To provide a connection between theory and practice for the principles introduced in 221 phys lectures. 2. Develop the technical skills by using specialized equipment, materials and tools. Technical, practical, observational, manipulative and measurement skills will also be developed. 3. Promote teamwork skills necessary to perform effectively as a physics student and the sense of ethical and professional responsibility. 4. Acquire the skills for measurement techniques. In addition, a strong emphasis on laboratory documentation, report writing, and oral presentation. 5. To be able to make careful experimental observations and how to think about and draw conclusions from such data. And use the computers to analysis the collecting data, and relate their result with numerical modelling to the relevant theory.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	0	0
2.	E-learning	0	0
3.	Hybrid • Traditional classroom • E-learning	0	0
4.	Distance learning	0	0

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	0
2.	Laboratory/Studio	52
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
	Total	52

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	State the basic laws of the electromagnetic field through a broad range of interesting real applications. Recognize the e/m ratio of an Electron knowledge the voltage and current transformer. Tell about the concept of Faraday theory of induction and its applications in different fields.	K1	• Lecture. • Preparing of laboratory experiments reports on their outcomes, • completing tutorial pre-lab questions • designed to give further practice in application of theory. • Lab demonstrations, memorization, individual presentation.	• Going through the student notebook and discussing the results • Experimental exams at the end of the semester. • Reports, individual and in group
1.2	The students have to know how to : register the name and purpose of the experiment, put appropriate words to explain the experiment, aim and set appropriate settings.	K2		
1.3	use laboratory equipment conduct relevant experiments, to generate data, save and record results,	K3		

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	re-experiment to obtain accuracy in readings and measurements.			
2.0	Skills			
2.1	Prepare the experiment and install it, Demonstrates experience and how it works.	S1	• Through teaching by focusing on the abovementioned points • Define duties for each experiment • Advise students to search on some of the mentioned technologies either on websites or in library and make reports. Individual presentation, brainstorming.	• Written and verbal assessment. • Debates, • lab reports, • portfolios, • long and short essays, • Exams.
2.2	Ability to calculates some numerical issues, interpret expected and unexpected results	S2		
2.3	Answers questions and raises questions if there is something unclear, Work collectively to achieve the best results, summarize the results and evaluate the Experience. Criticizes and evaluates results.	S3		
3.0	Values, autonomy, and responsibility			
3.1	The student must have the ability to: explain, the importance of the experiment and the steps of work in it choose the right tools to do the experiment and the appropriate parameters.	V1	• Work independently and as part of a team. • Manage resources, time and other members of the group. • lecture, small group work, research activities, • lab demonstrations,	• Discussion. interaction with the lectures and discussions interviews

C. Course Content

No	List of Topics	Contact Hours
1.	Study of step-up and step-down transformer, both in current and voltage case.	4
2.	Study resonance in RCL series circuits to find bandwidth and Quality factor both theoretically and experimentally	4
3.	Measuring the Earth's magnetic field using Biot-Savart Law on circular conductor having different no. of loops	4
4.	Determination of the charge to mass ratio for the electron (e/m) using Thomson tube method	4
5.	Determination of dielectric constants of different materials using RCL resonance circuit and verify the value of permittivity of free space	4
6.	Find charge of electron using Millikan oil drop experiment	4
7	To find Hall Co-efficient using Hall effect apparatus	4
8.	To find B using current carrying conductor placed in a permanent magnet	4
9.	Find magnetic field B using Search Coil	4
10.	Measurement of High Resistance using capacitor discharge method through Ballistic Galvanometer	4
Total		40

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Pre-lab assignment	Weekly	20%
2.	Report	Weekly	40%
3.	Final exam	From 13 to 14	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Physics for Scientists and Engineers, by R. A. Serway and J. W. Jewett, 9th Ed., Publisher: Cengage Learning
Supportive References	الفيزياء المتقدمة: أ.د توفيق قسام أ.د محمد قعقع د.توفيق ياسين
Electronic Materials	https://phet.colorado.edu/en/simulations/category/physics
Other Learning Materials	Internet sites relevant to the course

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A laboratory which accommodates 12 students.
Technology equipment (projector, smart board, software)	Whiteboard and Smart board
Other equipment (depending on the nature of the specialty)	Not applicable

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students\ Peer Reviewer	Indirect \ direct
Effectiveness of students assessment	Students- Faculty	Direct
Quality of learning resources	students	Indirect
The extent to which CLOs have been achieved	Faculty	Indirect
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Physics Department's council
REFERENCE NO.	6th (1st term/1446)
DATE	22/05/1446