هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Electricity and Magnetism
Course Code:	2032103-4
Program:	Physics
Department:	physics
College:	Science
Institution:	Taif University
Version:	2023
Last Revision Date:	23 September 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (4)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (3)					
4. Course general Description:					
This course covers important parts in electricity and magnetism. Students will study electric field, electric flux, Gauss`s law and its applications. Capacitance and Dielectrics will be studied. Electromotive force, direct Current Circuits, Kirchhoff`s circuit rules and its applications will be covered. Magnetic fields and magnetic forces are also included. Finally, Faraday's law, electromotive force and some different types of AC circuits will be studied.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
•Establishes a foundation in electricity and magnetism in preparation for more advanced courses. •Introduces main topics theoretically and experimentally in electricity, magnetism, and its electrics circuit's applications. •Recognizes the connection between electricity and magnetism and its applications. •Gives an overview and understanding of basic physics, with moderate use of mathematical formalism in electricity and magnetism. •Develop the skills of problem solving and practice of electricity, magnetism, and related applications. •Acquire the necessary skills of conducting experiments, data interpretation, and					

experimental reports preparation.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		90

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	**Define the basic concepts and theories of electric field, magnetic field, capacitance, and dielectrics.**	**K2**	**Lecture Discussion**	**Written exam**
1.2	**Recognize the**	**K3**	**Lecture**	**Written exam**

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	theories and methods for analyzing DC and AC circuits with different structures and its applications.		Discussion Problem-based strategy. Brainstorming sessions.	Lab reports Lab exam
...				
2.0	Skills			
2.1	Solve problems of electric and magnetic fields, DC, AC electric circuits, and related topics by means of the fundamentals, concepts, and theories.	S2	Problem-based strategy. Brainstorming sessions.	Written exam including problem solving. Activities such as assignments and problem-solving missions
2.2	Analyze qualitatively and quantitatively experimental data of DC and AC electric circuits.	S4	Practical Cooperative Learning Strategy.	Lab reports Lab exam
...				
3.0	Values, autonomy, and responsibility			
3.1	Communicate effectively within a group when performing activities, assignments, and experiments.	V2	Lab work Essays	Lab reports Lab exam Essay evaluation
3.2	Act responsibly and be able to prepare a written scientific report	V3	Lab work Discussions	Indirect evaluation
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Unit 1: Electric field** - Electric field from a continuous charge distribution - Electric flux - Gauss's law - Calculation of electric field by Gauss's law	6
2.	**Unit 2: Capacitance and Dielectrics** - Capacitance definition - Calculation of capacitance for types of capacitors - Stored electrostatic energy in a capacitor - Effect of dielectric on the capacitance	7
3.	**Unit 3: Direct Current Circuits** - Electromotive force - Kirchhoff circuit rules and applications - Charging and discharging a capacitor through a resistor	6
4.	**Unit 4: The Magnetic field** - Definition and units of magnetic field - Some properties of the magnetic field - Forces on isolated, moving charges in a magnetic field - Velocity selector and Mass spectrometer - Torque on a current loop in a uniform magnetic field	7
5.	**Unit 5: Sources of Magnetic field** - Biot-Savart Law - Force between two parallel wires - Ampere Law - Magnetic field of a Solenoid and Toroid - The flux of the magnetic field and Gauss's Law in Magnetism	6
6.	**Unit 6: Induced electromotive force** - Faraday's law of induction - Lenz's principle - Inductance - Energy stored in a magnetic field - Electrical generators	7
7.	**Unit 7: Alternating current circuits** - Ohmic resistor in an AC circuit - A capacitor in an AC circuit - An inductive coil in an AC circuit - rms voltage and rms current - Average power delivered by an AC source - RLC in an AC circuits	6

	- Resonance in RLC AC circuit	
	Part 2	
1	Experiment 1: Kirchhoff's Laws	4.5
2	Experiment 2: Voltage transformation with a transformer	4.5
3	Experiment 3: Determination of self-inductance of an inductive coil in a series RL AC circuit	4.5
4	Experiment 4: Determination of the capacitance of a capacitor in a series RC AC circuit	4.5
5	Experiment 5: Charging and discharging of capacitor	4.5
6	Experiment 6: Use of Oscilloscope in the measurement of AC Voltage and Frequency	4.5
7	Experiment 7: Relationship between Vpp, Vm and Vrms in the calibration of Oscilloscope and/or potentiometer	4.5
8	Experiment 8: Tangent galvanometer	4.5
9	Experiment 9: Resonance RLC AC circuit	4.5
10	Reports evaluation and practical exam	4.5
Total		90

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Periodical exam 1	8th	20%
2	Periodical exam 1	12th	10%
3	Activities (Quizzes)	Periodically	10%
4	Lab reports	Weekly/ 10th	15%
5	Final Lab Exam	10th	5%
6	Final exam	16th	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	Raymond A. Serway and John W. Jewett, Jr., Physics for Scientists and Engineers with Modern Physics, 9th Edition, Publisher: Brooks/Cole, Print ISBN-13: ISBN: 978-1133954057, (2014).
Supportive References	Raymond A. Serway, Chris Vuille, College Physics, 10th Edition, Publisher: Cengage Learning, 978-1285761954, (2014).
Electronic Materials	Interactive simulations for science and math: https://phet.colorado.edu/
Other Learning Materials	CD associated with the textbooks (when available). Lecture notes and PowerPoint presentations prepared by the lecturer.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	•**Classrooms** •**Electricity and magnetism physics laboratory**
Technology equipment (projector, smart board, software)	•**Data show** •**Laptop** •**Smart Board**
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Instructor Program Coordinator Departmental council Faculty Council	Indirect
Effectiveness of Students' assessment	Program leaders Instructor	Indirect
Quality of learning resources	Students Instructor Faculty	Indirect
The extent to which CLOs have been achieved	Program leaders Instructor	Direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	PHYSICS DEPARTMENT COUNCIL
REFERENCE NO.	NO. 4-45
DATE	27/09/2023 (12/03/1445)

قسم الفيزياء
Physics Department
TU
جامعة الطائف
TAIF UNIVERSITY