هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

Course Title: :	**Physics (2)**
Course Code:	**PHY 1118**
Program:	**B.Sc. in Engineering**
Department:	**Physics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**1-Template 2024**
Last Revision Date:	***26/09/2024***

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A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐ College	☐ Department	☐Track	☒ Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 2/ Year 1)					
4. Course General Description:					
This course introduces the basic principles of electricity and magnetism. Students will develop problem-solving skills and build a strong foundation for future studies in physics. Topics include electric fields, Gauss's law, electric potential, capacitance and dielectrics, magnetic fields, Faraday's law, inductance, and alternating current circuits. The course emphasizes understanding key physical laws and applying them to real-world situations.					
5. Pre-requirements for this course (if any)**:**					
Physics (1), PHY 1117					
6. Co-requisites for this course (if any)**:**					
Physics Lab. (2) , PHY 1120					
7. Course Main Objective(s):					
At the end of the course, students will be able to : • **Build up basic skills necessary for solving problems with practical applications by using physical principles.** • **Learn and understand the basic knowledge in electrostatics and magnetostatics.** • **Demonstrate the ability to formulate, interpret and draw inferences from their knowledge.** • **Demonstrate competence with a wide variety of mathematical tools and techniques.** • **Develop a good understanding and appreciation of electrostatics and magneto-statics.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**30**
2.	**Laboratory/Studio**	**0**
3.	**Field**	-
4.	**Tutorial**	**30**
5.	**Others (specify)**	**0**
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Describe the basic knowledge of the electricity and magnetism.**		• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Participation. ▪ Discussions.
1.2	**Recognize the underlying physical principles behind various daily life phenomena.**		• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Homeworks. ▪ Quizzes.
1.3	**Outline the concepts of Faraday's law and inductance.**		• Lectures. • Class discussions. • Tutorials.	▪ Participation. ▪ Exams. ▪ Discussions. ▪ Homeworks.
1.4	**State the basic understanding of the alternating current circuits.**		• Lectures. • Class discussions. • Tutorials.	▪ Exams. ▪ Participation. ▪ Discussions.
2.0	**Skills**			
2.1	**Explain and summarize the basic knowledge gained from studying electricity and magnetism.**		▪ Lectures. ▪ Class discussions. ▪ Tutorials.	▪ Exams. ▪ Discussions. ▪ Participation.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.2	**Develop the students ability to solve and analyze problems in physics related the topics covered by the course.**		▪ Problem classes and group tutorial. ▪ Homework assignments as well as problems solutions.	▪ Exams. ▪ Discussions. ▪ Homework.
2.3	**Communicate in a clear and concise manner orally, and using IT for acquiring and analyzing information.**		• Lectures. • Class discussions. • Tutorials. • Encourage students to use electronic mail and internal network for submitting homework and assignments. • Use digital library.	▪ Exams. ▪ Participation and activities of students in the course community and blackboard. ▪ Homework.
3.0	**Values, autonomy, and responsibility.**			
3.1	**Show the collaboration and inter-professionalism in class discussions or team works, as well as solve problems independently.**		• Small team tasks • Open discussion at classroom. • Office hours.	▪ Participation. ▪ Homework. ▪ Mini-project(s).

C. Course Content

No	List of Topics	Contact Hours
1.	**Electric Fields:** Properties of electric charges, Charging objects by induction, Coulomb's law, Electric field, Electric field of a continuous charge distribution, Electric field lines, Motion of a charged particle in a uniform electric field.	**8**
2.	**Gauss's Law:** Electric flux, Gauss's law, Application of Gauss's law to various charge distributions, Conductors in electrostatic equilibrium.	**8**
3.	**Electric Potential:** Electric potential and potential difference, Potential difference in a uniform electric field, Electric potential and potential energy due to point charges, Obtaining the value of the electric field from the electric potential, Electric potential due to continuous charge distributions, Electric potential due to a charged conductor.	**8**
4.	**Capacitance and Dielectrics:** Definition of capacitance, Calculating capacitance, Combinations of capacitors, Energy stored in a charged capacitor, Capacitors with dielectrics, Electric dipole in an electric field.	**8**
5.	**Direct Current Circuits:** Electric current, Resistance, Resistance and temperature, Electrical power, Electromotive force, Resistors in series and parallel, Kirchhoff's rules, RC circuits.	**8**
6.	**Sources of the Magnetic Field:** Magnetic fields and forces, Motion of a charged particle in a uniform magnetic field, Magnetic force acting on a	**8**

	current-carrying conductor, Torque on a current loop in a uniform magnetic field, Biot–Savart law, Magnetic force between two parallel conductors, Ampère's law, Magnetic field of a Solenoid, Gauss's law in magnetism.	
7.	**Faraday's Law and Inductance:** Faraday's law of induction, Motional emf, Lenz's law, Induced emf, Self-induction and Inductance, RL circuits, Energy in a magnetic field, Mutual inductance, RLC Circuit.	**8**
8.	**Alternating-Current Circuits:** AC sources, Resistors in an AC circuit, Inductors in an AC circuit, Capacitors in an AC circuit, RLC series circuit, Power in an AC circuit, Resonance in a series RLC circuit, Transformer and power transmission.	**4**
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Class Activities (class quizzes, homework, solving problems, etc.....)**	**weekly**	**20 %**
2.	**Midterm Exam 1**	**6thweek**	**20 %**
3.	**Midterm Exam 2**	**12thweek**	**20 %**
4.	**Final Exam**	**16thweek**	**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	- Serway R.A. and Jewett J.W., ***Physics for Scientists and Engineers with Modern Physics,*** 9th Edition, Brooks/Cole, Belmont, CA, USA (2014).
Supportive References	- Halliday D. and Resnick R., Physics, 9thEdition, John Wiley and sons (2011).
Electronic Materials	**https://units.imamu.edu.sa/colleges/en/science/Pages/default.aspx**
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	**- Classrooms.** **- Labs.**

Items	Resources
Technology equipment (projector, smart board, software)	- Classroom equipped with a whiteboard and a projector.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	- Students - Second examiner	- Indirect (The students complete the evaluation forms at the end of term. Final exam is evaluated by the second examiner)
Effectiveness of Students assessment	- Instructors	- Direct (exams, HW, project, ...)
Quality of learning resources	- Faculty - Students	- Indirect (surveys)
The extent to which CLOs have been achieved	- Instructors - Program Leaders	- Direct (excel sheet)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Quality Unit-Physics Department
REFERENCE NO.	Department council No. 06
DATE	26/09/2024