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

Course Specification
(Bachelor)

Course Title:	Physics 2 for Engineering
Course Code:	PHYS1111
Program:	Bachelor Engineering Programs
Department:	Department of Physics
College:	College of Science
Institution:	Umm Al-Qura University
Version:	47
Last Revision Date:	12/1/2025

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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: (Level 2 / Year 1)					
4. Course General Description:					
After completing the first general physics course (prior to this course), students will study in this course some basic concepts of electricity and magnetism besides basic principles of optics as well. This includes Coulomb's law, electric potential, Gauss's law, electric and magnetic fields, electric current and circuits, induction and Faraday's law, and geometrical optics. Students focus on solving calculus-based physics problems.					
5. Pre-requirements for this course (if any)**:**					
PHYS1110 Physics 1 for Engineering MTH1181 Calculus (1) for Engineering					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
The course is designed to provide students with some basic and essential concepts in general physics (E & M, and optics), with a strong emphasis on solving calculus-based physics problems. The main subjects that this course covers are listed below. In addition to these items, the students should gain practical skills through conducting experiments in the laboratory.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	90	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 PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Define electricity concepts such as electric change, potential, current and field	KLO1, KLO3	Lectures and lab experiments	Exams, homework and quizzes
1.2	Explain phenomena related to magnetic and electric fields	KLO1, KLO3		
1.3	Explain the interaction of light with materials	KLO1, KLO3		
2.0	**Skills**			
2.1	Calculate force due to magnetic and electric fields	KLO1, KLO3	Lectures and lab experiments	Exams, homework and quizzes
2.2	Relate electric field to magnetic field (and their applications)	KLO1, KLO3		
2.3	Analyze electric circuits	KLO1, KLO3		
3.0	**Values, autonomy, and responsibility**			
3.1	Work effectively responsibly in teamwork	KLO7	Lectures and lab experiments	Exams, homework and quizzes

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Electric charge** ● Electric Charge ● Conductors and Insulators ● Coulomb' Law ● Charge is Quantized	4
2.	**Electric fields** ● The electric field ● The electric field due to a point charge ● A point charge in an electric field	2
3.	**Gauss' law** ● Flux of an Electric Field ● Gauss' Law ● Applying Gauss's Law : Planar Symmetry	5
4.	**Electric potential** ● Electric potential energy ● Electric potential ● Calculating the potential from the field ● Potential due to a point charge and due to a group of point charges ● Calculating the field from the potential ● Electric potential energy of a system of point charges	5
5.	**Capacitance** ● Capacitance ● Calculating the Capacitance of a Parallel-Plate Capacitor (only) ● Capacitor in Parallel and in Series ● Energy Stored in an Electric Field ● Capacitor with a Dielectric	4
6.	**Current and resistance** ● Electric current ● Current density ● Resistance and resistivity ● Ohm's law ● Power in electric circuits	4
7.	**Circuits**	4

	• Work, Energy and Emf • Calculating the Current in a Single- Loop Circuit • Other single-Loop Circuits	
8.	**Magnetic fields** • The definition of b • A circulating charged particle • Magnetic force on a current-carrying wire	2
9.	**Magnetic fields due to currents** • calculating the magnetic field due to a current • Ampere's law • Solenoids and toroids	4
10.	**Induction and Inductance** • Faraday's Law of Induction • Induced Electric Fields • Inductors and Inductance • Self-Induction • Energy Stored in a Magnetic Field • Mutual Induction	5
11.	**Optics** • Reflection and Refraction (Snell's Law) • Total Internal Reflection • Images: Plane Mirrors, Spherical Mirrors and Thin Lenses	6
12.	**Practical part:** • Students will conduct various experiments in the practical part of the course. Each student will perform the experiment, collect data, extract result, and prepare a written report every week.	45
Total		**90**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes and homework	All weeks	10%
2.	Midterm exam	9th week	20%
3.	Lab report	Every week	10%
4.	Lab final practical exam	15th week	10%
5.	Final exam	End of term	50%

*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	Halliday & Resnick, Jearl Walker, "Fundamentals of Physics" 10th Edition (2018)
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classrooms • Labs
Technology equipment (projector, smart board, software)	• Blackboard • 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	Questionnaire (indirect)
Effectiveness of Students assessment	Instructors of the course	Peer review of exam marking (direct)
Quality of learning resources	Instructor	Course report (indirect)
The extent to which CLOs have been achieved	Instructor	Course report (indirect)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**ACADEMIC CURRICULUM AND PLANS COMMITTEE IN COLLEGE OF ENGINEERING AND ARCHITECTURE**
REFERENCE NO.	
DATE	**12/1/2025**

