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

Course Specification
(Bachelor)

Course Title:	Physics-2
Course Code:	2411 Phys-4
Program:	Bachelor's in Engineering
Department:	Physics
College:	Science
Institution:	King Khalid University
Version:	TP-153-2024
Last Revision Date:	29/10/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (4)					
4 (3+1)hrs.					
2. Course type					
A.	☒ University	☐ College	☐ Department	☐ Track	☒ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Level 3, second year)					
4. Course General Description:					
This course is to present it in a simple and understandable way to students to explain the fundamentals of general as well as engineering physics and its applications in life. The students will learn the adaptability to new developments in science and technology during pursuing their engineering degree. As their course contains topics on simple harmonic motion, waves, optics, modern physics and materials science, so they will learn and understand the different phenomenon of engineering physics and its applications.					
5. Pre-requirements for this course (if any):					
1414 Phys (General Physics-1)					
6. Co-requisites for this course (if any):					
Not Required					
7. Course Main Objective(s):					
The main objective of this course is to improve the ability to think logically about the problems of science and technology and obtain their solutions. This course is aimed to offer broad areas of physics which are required as an essential background to engineering students. The student should be able to know, understand, and use the mathematical concepts and physical laws related to topics of simple harmonic motion, waves, optics, modern physics and materials science. After successful completion of the course the students will have adequate understanding of different phenomena in physics with the application in various branch of engineering.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	5h(3+2)/week	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**	48
2.	**Laboratory/Studio**	32
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		80

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 the basic concepts and theories related to simple harmonic motion, waves, and intensity variation in light including modern physics.	K1	Lectures and Discussion	Written examinations Home work Quizzes Oral Exam
1.2	Describe the concepts and principles of energy transported by waves, the dual nature of light/matter, atomic spectra of H-atom, and superconductivity	K2	Lectures and Discussion	Written examinations Home work Quizzes Oral Exam
1.3	Explain the operational principle, analysis, and	K3	Lectures and Discussion	Written examinations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	design of Standing waves, Newton rings, and electron diffraction experiments			Home work Quizzes Oral Exam
2.0	**Skills**			
2.1	Show and solve various problems related to engineering physics.	S1	Lectures, Tutorials	Examinations, Assignments,
2.2	Prepare experiments and analyze data for the results of experiments.	S2	Lab demonstrations	Lab Report, Lab Activity, Lab Examinations
2.3	Demonstrate the skills of recording the observations of an experiment scientifically including plotting graphs and curve fittings.	S3	Discussions, Lab Demonstration, Group work	Faculty Observation
3.0	**Values, autonomy, and responsibility**			
3.1	Participate in commitment to professional and social responsibilities including ethical principles.	V1	Discussions Demonstrations	Faculty Observation, Group report
3.2	Practice communicating with others and cooperating with them.	V2	Discussions, Demonstration, Group work	
3.3	Appraise the self-confidence to enter the job market or integrate graduate programs	V3	Group work and class discussions	

C. Course Content (Theoretical and tutorial part)

No	List of Topics	Contact Hours
1.	Simple Harmonic Motion (SHM): Kinematics of SHM, Velocity and acceleration of SHM, Dynamics of SHM, Simple pendulum, Mass-Spring System, Physical Pendulum, Energy of SHM, Damped Oscillations.	**9**
2.	One dimensional wave motion and Sound Wave: Types of waves, one dimensional sinusoidal waves, Wave Equation, Wave velocity on a string, Energy transported by sinusoidal waves, Intensity of sound waves, Standing waves, Doppler effect in sound waves, Numerical problems	**9**
3.	Interference, Diffraction and Polarization of light: Constructive and destructive interference, Conditions of maxima and minima in Young;s double slit experiment, Single slit diffraction, Diffraction limited optics, Rayleigh criteria of resolution, Resolving power of diffraction grating, Concept of polarization of light waves, Brewster's Law, Malus Law, Numerical problems	**9**
4.	Plank's quantum theory of radiation Black body radiation, Wien's displacement Law, Stefan's Law, Planck's radiation formula, Numerical problems	**3**
5.	Photoelectric Effect:	**3**

	Dual nature of light, Concept of Photons, Photoelectric effect, Einstein's photoelectric equation, Numerical problems	
6.	Compton Effect: Compton scattering by X-rays, Compton shift formula, Numerical problems	3
7.	Wave properties of particles: de-Broglie hypothesis, de-Broglie wavelength of matter waves, Davisson Germer Experiment, Numerical problems	3
8.	Atomic Spectra and Bohr model of the atom: Bohr's model of atom, Spectrum of hydrogen atom, Numerical problems	3
9.	Specific heat of Solids: Degree of freedom, Molar and specific heat capacity, Einstein formula	3
10.	Superconductivity: Concept of zero electrical resistivity, Transition Temperature, Effect of Magnetic field on superconductivity, Meissner effect, Type I and Type II superconductors.	3
Total		**48**

Lab Experiments:

No	List of Topics	Contact Hours
1	General definition of the laboratory (experiments - reports - graph - safety instructions)	2
2	Concept of errors in measurements and curve fitting (To draw best line)	2
3	Simple pendulum experiment (To find acceleration due to gravity)	2
4	Experiment with standing waves (To find the mass per unit length of the string)	2
5	Balmer's series of Hydrogen atom experiment (To find Rydberg's constant)	3
6	Review of Lab reports	3
7	Electron diffraction experiment (To find the wavelength of electron wave)	3
8	Newton's rings experiment (To find the wavelength of monochromatic light)	3
9	Planck constant experiment (To find the Planck's constant)	3
10	Hall effect (To find the conductivity of semiconductors)	2
11	Tutorial based on experiments	2
12	Tutorial based on experiments	2
13	A review of all laboratory experiments and lab reports with a general discussion	2
Total		**32**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz and Assignments	5th& 12th	10%
2.	Mid Exam	10th	30%
3.	Practical Exam	End of Term	20%
4.	Final Exam	End of Term	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	University Physics by Western and Crummett, 1994
Supportive References	University Physics by Resnick and Halliday
Electronic Materials	• Saudi Digital Library (SDL) • http://lib.kku.edu.sa/ to search latest reference and textbooks of course
Other Learning Materials	**NA**

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	One lecture room with 50 seats (Available)
Technology equipment (projector, smart board, software)	Data Show (Projectors) in lecture room (Portable projector Available)
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Program Leaders	Direct
Effectiveness of Students assessment	Faculty, Peer Reviewer and Q &D Committee	Direct/Indirect
Quality of learning resources	Programs & Curricula Committee and Q &D Committee	Direct/Indirect
The extent to which CLOs have been achieved	Quality and Development Committee	Indirect
Other	Students, Program Leaders	Direct

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physics Department Council
REFERENCE NO.	The meeting No. 6 for the academic year 1446, the recommendation No. 3.6.46
DATE	2/5/1446 H