

T-104

Course Specification

Course Title: Physics-2
Course Code: PHYS 2411-4
Program: Bachelor's in Engineering
Department: Physics
College: Science
Institution: King Khalid University
Version: 2
Last Revision Date: 26/3/2023

Table of Contents:

Content	Page
H. General Information about the course	15
1. Teaching mode (mark all that apply)	15
2. Contact Hours (based on the academic semester)	15
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	16
C. Course Content	18
D. Student Assessment Activities	18
E. Learning Resources and Facilities	19
1. References and Learning Resources	19
2. Required Facilities and Equipment	19
F. Assessment of Course Quality	20
G. Specification Approval Data	20

A. General information about the course:

Course Identification	
1. Credit hours:	4+1=5
2. Course type	
a.	University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Track <input type="checkbox"/> Others <input type="checkbox"/>
b.	Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: Level 3 / Year 2	
1. Course Description	
<p>This course is to present it in simple and understandable way to students to explain the fundamentals of general as well as engineering physics and its applications in life. They will learn the adaptability to new developments in science and technology during pursuing their engineering degree. As their course contains topics on Vibrations, waves, optics, modern physics and materials science, so they will learn and understand the different phenomenon of engineering physics and its applications as following:</p> <p>Vibrations (simple harmonic motion, to compute the frequency and period of simple harmonic motion, to determine the position, velocity and acceleration for simple harmonic motion and to compute kinetic, potential and mechanical energy of a simple harmonic oscillator with suitable examples).</p> <p>Light and sound waves (wave, equation for waves, wave superposition, the nature of sound waves, factors affecting sound waves, sound intensity level of sound waves, Doppler effect. interference, diffraction (single slit) and polarization of light).</p> <p>Modern physics (Black body radiation, Planck's quantum hypothesis, photoelectric effect, photon, de Broglie wavelength).</p> <p>Materials Science (Bohr model of atoms, specific heat of solids and Superconductivity).</p> <p>In addition to some experiments in light and waves, modern physics and materials science.</p>	
5. Pre-requirements for this course (if any): General Physics	
6. Co- requirements for this course (if any): Not required	
7. Course Main Objective(s)	
<p>After completing this course, the student should be able to know, understand, and use the mathematical concepts and laws related to topics of SHM, waves, optics, modern physics and materials science. On the other hand, the student will be:</p> <ol style="list-style-type: none">1. Familiar with types of oscillations.2. Intimate with the wave equation and its uses.3. Understand combination and interference of electromagnetic and sounds waves.4. Understands basic concepts related to blackbody radiation, photoelectric phenomena, and Compton dispersion.	

5. Understands what is meant by semiconductors, their types, and applications

6. Fluent in analyzing practical experiments results and writing reports

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
	Traditional classroom	60	100 %
	E-learning	0	0 %
	Hybrid <ul style="list-style-type: none">• Traditional classroom• E-learning	0	0 %
	Distance learning	0	0 %

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1	Lectures (4 hours / week)	48
2	Laboratory/Studio (1 Hour / week)	12
3	Field	0
4	Tutorial	12
5	Others (specify)	0
	Total	72 Hours

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	Learn the basic theories and experimental results of some phenomena in waves, vibrations, and light.	K1	Lectures and experimental lab.	Homework assignments, short quizzes Write Exams Reports
1.2	Think in the interest of the concepts and principles of waves, modern physics and superconductivity in engineering.	K2		
1.3	Explain the operational principle, analysis, and design of; Standing waves, Newton rings and electrons diffraction.	K3		
2.0	Skills			
2.1	Interpret some physical phenomena in vibrations, optics sound and modern physics.	S1	Lectures and Lab	Exams, Assignments, Quizzes
2.2	Relate the concepts and principles of modern physics and materials science with the engineering applications.	S2	Group discussions	Exams, Assignments, Quizzes
2.3	Write a weekly report including the results, analysis and discussion for each experiment.	S3		
3.0	Values, autonomy, and responsibility			
3.1	Evaluate some scientific problems	V1		

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	by students and write the corresponding reports		Discussions Demonstrations	Presentations Group report
3.2	Fluent in communicating with others and cooperating with them.	V2		
3.3	Summarize the main points of the course and develop them through self-learning.	V3		

C. Course Content (Theory)

No	List of Topics	Contact Hours
15.	Simple Harmonic Motion	12
16.	One dimensional wave motion and Sound	12
17.	Interference, Diffraction and Polarization of light	10
18.	Plank's quantum theory of radiation	2
19.	Photoelectric effect and photons	2
20.	Compton Scattering	2
21.	Wave properties of particles	2
22.	Atomic Spectra and Bohr model of the atom	2
23.	Lattice vibrations and specific heat of Solids	2
24.	Superconductivity and introduction to Quantum Statistics	2
Total		48

Practical:

No	List of Topics	Contact Hours
1	General definition of the laboratory (experiments - reports - graph - safety instructions)	2
2	Simple pendulum experiment	2
3	Experiment with standing waves	2

4	Balmer's series of Hydrogen atom experiment	2
5	Tutorial based on experiment 2	2
6	Electron diffraction experiment	2
7	Newton's rings experiment	2
8	Planck constant experiment (Tutorial)	2
9	A review of all laboratory trials with a general discussion of the weekly reports	4
10	Tutorial based on experiment 3-6	4
Total		24

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
18.	Mid Exam	7th	20%
19.	Quiz (Blackboard)	7th	10%
20.	Assignment I	6th	2.5%
4.	Assignment II	11th	2.5%
5.	Practical Part (reports and exams)	12th	25%
6.	Final exam	13th	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	Book: University Physics by Western and Crummet
Supportive References	University Physics by Resnick and Halliday
Electronic Materials	1- YouTube videos for engineering physics 2- Arabic websites for Physics 3- E- learning blackboard facility provided by the university. 4- The internet in general.
Other Learning Materials	-

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Available classroom and laboratory
Technology equipment (projector, smart board, software)	Available
Other equipment (depending on the nature of the specialty)	Some apparatus is required so as to maintain the quality of lab learning process.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Questionnaires (Direct)
Effectiveness of students assessment	Program Leaders, Peer Reviewer	Periodic self-assessment of the program. (Indirect)
Quality of learning resources	Faculty, Peer Reviewer	Analyzing of the results of students (Direct)
The extent to which CLOs have been achieved		
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Physics department Council
REFERENCE NO.	The meeting No. 11 for the academic year 1439-1440, the recommendation No. 6-11-39/40
DATE	26-3-2023