هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

Course Specification
(Bachelor)

Course Title	**General Physics for Health Science**
Course Code:	**102Phys-4**
Program:	**Joint Program**
Department:	**Physics**
College:	**Science**
Institution:	**King Khalid University**
Version:	**TP-153 (2024)**
Last Revision Date:	**8/10/2024**

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: (2nd /First year)					
4. Course General Description:					

4. Course General Description:

Physics 102 is an introductory physics course designed for Health Sciences students. It incorporates both theory and laboratory experiments in developing and understanding the following concepts:
Units, dimensions, and vectors, Laws of Motion, Statics, Work, energy, and power
Elastic and thermal properties of materials, Non-viscous and viscous fluids, Waves and sound
Optics, Modern physics, Nuclear physics, Practical Part
The practical part of the course provides a first-hand experience that illustrates the major concepts discussed in the theory classes.

5. Pre-requirements for this course (if any):

N/A

6. Co-requisites for this course (if any):

N/A

7. Course Main Objective(s):

Upon successful completion of this course, students will be able to:

- Know the basic principles of physical measurements, conversion of units, and dimensional analysis.
- Understand the difference between scalar and vector quantities and all vector algebra operations.
- Describe Newton's laws of motion and their applications.
- Understand the basic principles of statics, torque, couples, centre of gravity, and their applications to simple machines such as levers.
- Interpret work, kinetic energy, potential energy, the work-energy theorem, the conservation of energy principle, their applications, and power.
- Determine the elastic properties of materials.
- Know the thermal properties of matter and heat transfer.
- Study the mechanics of non-viscous fluids, fluid pressure, the equation of continuity, and Bernoulli's equation.

- Know the mechanics of viscous fluids and Poiseuille's law.
- Describe wave motion.
- Understand sound, intensity, and the intensity level of sound.
- Describe the wave properties of light and X-ray diffraction.
- Study mirrors, lenses, and imaging.
- Define the wave-particle duality.

Understand nuclear physics, radiation physics, and ionizing radiation.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	4h(3+2)/week	100%
2	E-learning	**0**	**0**
3	Hybrid ● Traditional classroom ● E-learning	**0**	**0**
4	Distance learning	**0**	**0**

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**48**
2.	**Laboratory/Studio**	**32**
3.	**Field**	**0**
4.	**Tutorial**	**0**
5.	**Others (specify)**	**0**
Total		**80**

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 fundamental theories and principles of medical physics	K1	Classroom Lectures	Quiz and Exam (Mid and Final)
1.2	Recognize the fundamentals of physics, including the definitions of force, torque, work, energy, power, pressure, stress, strain, and specific heat.	K2	Classroom Lectures	Quiz and Exam (Mid and Final)
1.3	Outline the applications of Physics in Medicine.	K3	Classroom Lectures	Quiz and Exam (Mid and Final)
2.0	**Skills**			
2.1	Practice critical thinking and efficient problem-solving skills in Physics	S1	Classroom Lectures and Tutorials	Quiz and Exams (Mid and Final)
2.2	Demonstrate Concepts of work and energy and their estimations.	S2	Classroom Lectures and Tutorials	Quiz and Exams (Mid and Final)
2.3	Solve Numerical problems based on physical equations.	S3	Classroom Lectures and Tutorials	Quiz and Exams (Mid and Final)
2.4	Apply the concept of fluid flow to solve problems in medicine	S4	Classroom Lectures and Tutorials	Quiz and Exams (Mid and Final)
…				
3.0	**Values, autonomy, and responsibility**			
3.1	Show social responsibility and ethical principles.	V1	Classroom Lectures	Quiz and Exam (Mid and Final)
3.2	Work with a team to solve simple problems.	V2	Classroom Lectures	Assignments
3.3	Lead a team to understand the risks and benefits of radiation in medicine from a medical physics perspective.	V3	Classroom Lectures	Assignments
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Measurements, Units Dimensions and Vectors** Physical quantities including base and derived quantities, vectors and scalars, vector multiplication and resultant vector (Numerical Examples and Problems)	6
2.	**Newton's Laws of Motion** (Numerical solution of Examples and Problems)	3
3	**Statics** Conditions of equilibrium, calculation of torque Static Physics and (Numerical solution of Examples and Problems)	4
4	**Work, Energy and Power** Definitions of work and energy, work-energy principle, types of energy, Power (Numerical solution of Examples and Problems)	4
5	**Elastic Properties of Materials** Stress, strain and Young's Modulus, stress-strain graph (Numerical solution of Examples and Problems)	2
6	**Thermal Properties of Materials** Linear thermal expansion of materials including length, area and volume expansions (Numerical solution of Examples and Problems)	3
7	**The Mechanics of Non-Viscous Fluids** Types of fluids, the equation of continuity, Bernoulli's equation, the manometer, principles of blood pressure measurements and role of gravity on blood pressure (Numerical solution of Examples and Problems)	4
8	**Viscous Fluid Flow** Viscosity, Fluid flow types, power dissipation and flow resistance (Numerical solution of Examples and Problems)	4
9	**The Description of Wave Motion** Types of waves, wave parameters and velocity of waves (Numerical solution of Examples and Problems)	2
10	**Sound** Types of sound, Nature and speed of sound, sound intensity and auditory response (Numerical solution of Examples and Problems)	3
11	**Geometrical Optics, Mirrors, Lenses and Images** Reflection and Refraction of Light, Total internal reflection, Mirrors, lenses and image formation. Defects of eyes (Numerical solution of Examples and Problems)	6
12	**Wave-Particle Duality** Photon, Photoelectric effect, Compton Effect, Xray Diffraction	3
13	**Nuclear and Radiation Physics** Isotopes, types of radiations, half-life of nuclectides, physical and biological half-life. Units of radiations (Numerical solution of Examples and Problems)	4
	Total	**48**

No	List of Practicals	Contact Hours

1	Measurement of errors by Vernier callipers and micrometer	4
2	Specific heat capacity of solid by the method of mixture	2
3	Mechanical Equivalent of heat through an electrical method	2
4	Surface tension of liquids using the direct pull method. Effect of temperature variation on surface tension.	4
5	Study the effect of light refraction through glass and liquid and determination of their refractive indices.	4
6	Coefficient of viscosity of a viscous liquid by the Stokes method	2
7	Determination of the force constant of a helical spring and the acceleration due to gravity using the spring-mass system	4
8	Correction of visual defects (myopia and hypermetropia) in the eye. Comparison of experimental results with theoretical predictions.	4
9	Observation of the interference pattern from Young's double slit experiment and estimation of the resolving power of the human eye.	2
10	Study the characteristic curve of a G.M. tube. Measure the attenuation coefficient for metals. Relate the attenuation coefficient to the atomic number.	4
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	"Physics" Written by Joseph W. KANE and Morton M. STERNHEIM. Third Edition. JOHN WILEY & SONS, Inc. ISBN: 0-471-63345-5
Supportive References	University Physics: Models and Applications, William P. Crummett, Arthur B. Westcott. ISBN- 10: 0697111372 ISBN-13: 978-0697111999, William C Brown Pub (January 17, 1994).

	Physics, Volume 1, Robert Resnick, David Halliday, Kenneth S. Krane, 5th Edition, Wiley; 2001. ISBN-13: 978-0471320579, ISBN- 10: 0471320579
Electronic Materials	Web Sites, www.lms.kku.edu.sa to access lecture notes, lab manual, announcements related to the course etc.
Other Learning Materials	No further materials are recommended.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A classroom with facilities that accommodate forty students
Technology equipment (projector, smart board, software)	Data show, laptops, smart boards and internet
Other equipment (depending on the nature of the specialty)	----

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Periodic Self-assessment Students	Direct
Effectiveness of Students assessment	Faculty	Indirect
Quality of learning resources	Peer Reviewers	Direct
The extent to which CLOs have been achieved	Committee of Development and Quality	Direct & Indirect
Other		

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, recommendation No. 3.6.46
DATE	2/5/1446 H