هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد
NCAAA

2024
TP-153

# Course Specification
## (Bachelor)

| | |
|---|---|
| **Course Title:** | **Physics for Health Science** |
| **Course Code:** | **0303Phys** |
| **Program:** | **Health path** |
| **Department:** | **Physics** |
| **College:** | **Science** |
| **Institution:** | **King Khalid University** |
| **Version:** | **TP-153 (2024)** |
| **Last Revision Date:** | **10/1/2025** |

## Table of Contents



## A. General information about the course:

### 1. Course Identification

| | | | | | |
|---|---|---|---|---|---|
| **1. Credit hours: (2+1= 3hrs)** | | | | | |
| **2 Hrs (Theory) + 1Hrs (Practical)** | | | | | |
| **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:** | | | | | |

This course is to present 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
Optics
Modern physics
Nuclear physics
Practical Part

The practical part of the course provides 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, center of gravity.
- 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.
- Study mirrors, lenses, and imaging.
- Understand nuclear physics, radiation physics.

## 2. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | Traditional classroom | **16x2hrs/week=32** | **100%** |
| 2 | E-learning | **0** | **0** |
| 3 | Hybrid<br>● Traditional classroom<br>● E-learning | **0** | **0** |
| 4 | Distance learning | **0** | **0** |

## 3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1. | **Lectures** | **32** |
| 2. | **Laboratory/Studio** | **20** |
| 3. | **Field** | **0** |
| 4. | **Tutorial** | **0** |
| 5. | **Others (specify)** | **0** |
| **Total** | | **52hr** |

## 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 | Demonstrate a thorough knowledge of the fundamental theories and principles of medical physics | K1 | Providing all lectures in a classroom with an assistance of projecting devices | Written exams (including Quizzes) |
| 1.2 | Recognize the fundamentals of physics, including the definitions of force, torque, work, energy, power, pressure, stress, strain, and specific heat. | K2 | Providing all lectures in a classroom with an assistance of projecting devices | Written exams (including Quizzes) |
| 1.3 | Outline the applications of Physics in Medicine | K3 | Providing all lectures in a classroom with an assistance of projecting devices | Written exams (including Quizzes) |
| **2.0** | **Skills** | | | |
| 2.1 | To practice critical thinking and efficient problem-solving skills in Physics | S1 | Classroom Lectures and Tutorials | Quiz and Exams (Mid and Final) |
| 2.2 | Concepts of work and energy and their estimations | S2 | Classroom Lectures and Tutorials | Quiz and Exams (Mid and Final) |
| 2.3 | Numerical problems based on equations, and solving them | S3 | Classroom Lectures and Tutorials | Quiz and Exams (Mid and Final) |
| 2.4 | To 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 | To demonstrate social responsibility and ethical principles | V1 | Classroom Lectures | Explain and Discover an interactive discussion |
| 3.2 | To show independency in | V2 | Classroom Lectures | Explain and Discover |

| Code | Course Learning Outcomes | Code of PLOs aligned with the program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| | solving simple problems | | | an interactive discussion |
| 3.3 | To understand the risks and benefits of radiation in medicine, from a medical physics perspective. | V3 | Classroom Lectures | Explain and Discover an interactive discussion |

## 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) | 4 |
| 2 | **Newton's Laws of Motion** (Numerical solution of Examples and Problems) | 2 |
| 3 | **Statics** Conditions of equilibrium, calculation of torque Static Physics and (Numerical solution of Examples and Problems) | 5 |
| 4 | **Work, Energy and Power** Definitions of work and energy, work-energy principle, types of energy, Power (Numerical solution of Examples and Problems) | 5 |
| 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) | 2 |
| 7 | **The Mechanics of Viscous & Non-Viscous Fluids** Viscosity, Types of fluids, the equation of continuity, Bernoulli's equation, principles of blood pressure measurements, Fluid flow types (Numerical solution of Examples and Problems) | 5 |
| 8 | **The Description of Wave Motion** Types of waves, wave parameters and velocity of waves (Numerical solution of Examples and Problems) | 2 |
| 9 | **Geometrical Optics, Mirrors, Lenses and Images** Mirrors, lenses and image formation. Defects of eyes (Numerical solution of Examples and Problems) | 3 |
| 10 | **Nuclear and Radiation Physics** Isotopes, types of radiations, half-life of nucleotides, physical and biological half-life (Numerical solution of Examples and Problems) | 2 |
| | Total | 32 |
| | | |

| No | List of Practical's | Contact Hours |
|---|---|---|
| 1 | Measurement of errors by Vernier calipers and micrometer | 2 |
| 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.<br>Effect of temperature variation on surface tension. | 2 |
| 5 | Study the effect of light refraction through glass and liquid and determination of their refractive indices. | 2 |
| 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 | 2 |
| 8 | Correction of visual defects (myopia and hypermetropia) in the eye.<br>Comparison of experimental results with theoretical predictions. | 2 |
| 9 | Observation of the interference pattern from a 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.<br>Measure the attenuation coefficient for metals.<br>Relate the attenuation coefficient to the atomic number. | 2 |
| Total | | 20 |

## 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: 0-471-63845-5 |
| Supportive References | University Physics: Models and Applications, William P. Crummett<br>Arthur B. Western, |

| | |
|---|---|
| | ISBN- 10: 0697111997 ISBN-13: 978-0697111999, William C Brown Pub (January 17, 1994).<br><br>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,<br>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<br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | A classroom with its facilities that accommodates forty students |
| Technology equipment<br>(projector, smart board, software) | Data show, laptop, smart board and internet |
| Other equipment<br>(depending on the nature of the specialty) | ---- |

### Φ. Ασσεσσμεντ οφ Χουρσε Θυαλιτψ

| 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. 11[illegible] the academic year 1444-1445,the recommendation No. 45/46** |
| **DATE** | **1446 H** |