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

Course Specification
(Bachelor)

Course Title: :	**Physics (1)**
Course Code:	**PHY 1117**
Program:	**B.Sc. in Engineering**
Department:	**Physics**
College:	**Science**
Institution:	**Imam Mohammad Ibn Saud Islamic University**
Version:	**1-Template 2024**
Last Revision Date:	***26/09/2024***

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐ College	☐ Department	☐Track	☒ Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (Level 1/ Year 1)					
4. Course General Description:					
This course covers fundamental physics concepts, focusing on kinematics, work, and energy, with connections to everyday life. Topics include vectors, motion in 1, 2, and 3 dimensions, force, kinetic and potential energy, center of mass, linear momentum, rotation, equilibrium, and elasticity. While advanced math is not required, basic math, including some trigonometry and simple algebra, is used.					
5. Pre-requirements for this course (if any)**:**					
None					
6. Co-requisites for this course (if any)**:**					
Physics Lab (1) , PHY 1119					
7. Course Main Objective(s):					
At the end of the course, students will be able to: • **Understand the fundamental physical principles in Mechanics.** • **Build up an understanding of how physical principles are applied in everyday life and engineering.** • **Provide a clear understanding of the basic concepts and integrating their knowledge in various disciplines of physics.** • **Build up basic skills necessary for solving problems with practical applications by using physical principles.** • **Familiarize with the basic skills necessary for understanding of physical principles in terms of multiple representations: graphs, diagrams, equations.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		

No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**30**
2.	**Laboratory/Studio**	**0**
3.	**Field**	-
4.	**Tutorial**	**30**
5.	**Others (specify)**	**0**
Total		60

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	**Describe the concepts and principles in introductory study of physics.**		• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Participation. ▪ Discussions.
1.2	**Recognize the underlying physical principles behind various daily life phenomena.**		• Lectures. • Tutorials. • Class discussions.	▪ Exams. ▪ Homeworks. ▪ Quizzes.
1.3	**Describe physical phenomena using proper physical laws and theories in mechanics.**		• Lectures. • Class discussions. • Tutorials.	▪ Participation. ▪ Exams. ▪ Discussions. ▪ Homeworks.
1.4	**Define simple mathematical techniques for quantitative analysis in solving physics problems.**		• Lectures. • Class discussions. • Tutorials.	▪ Exams. ▪ Participation. ▪ Discussions.
2.0	**Skills**			
2.1	**Explain and summarize the basic knowledge gained from studying mechanics.**		▪ Lectures. ▪ Class discussions. ▪ Tutorials.	▪ Exams. ▪ Discussions. ▪ Participation.
2.2	**Develop the students ability to solve and**		▪ Problem classes and group tutorial.	▪ Exams. ▪ Discussions.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	analyze problems in physics related the topics covered by the course.		▪ Homework assignments as well as problems solutions.	▪ Homework.
2.3	**Communicate in a clear and concise manner orally, and using IT for acquiring and analyzing information.**		• Lectures. • Class discussions. • Tutorials. • Encourage students to use electronic mail and internal network for submitting homework and assignments. • Use digital library.	▪ Exams. ▪ Participation and activities of students in the course community and blackboard. ▪ Homework.
3.0	**Values, autonomy, and responsibility.**			
3.1	**Show the collaboration and inter-professionalism in class discussions or team works, as well as solve problems independently.**		• Small team tasks • Open discussion at classroom. • Office hours.	▪ Participation. ▪ Homework. ▪ Mini-project(s).

C. Course Content

No	List of Topics	Contact Hours
1.	**Vectors:** Coordinate Systems in 3 dimensions, Vectors and scalar quantities, Properties of vectors, Components of a vector and unit vectors.	6
2.	**Motion in 1 Dimension:** Position and displacement, Average velocity, Instantaneous velocity, Acceleration and instantaneous acceleration, One-dimensional motion with constant acceleration.	6
3.	**Motion in 2 and 3 Dimensions:** The position, Velocity and acceleration vectors in 3 dimensions, Projectile Motion.	6
4.	**Force and Motion:** Newton's first Law, Force and mass, Newton's second Law, Newton's third Law, Applications of Newton's Laws, Frictional force, Circular motion with uniform acceleration.	8
5.	**Kinetic Energy and Work:** Work done by a constant force, Scalar product, Kinetic energy and work kinetic energy theorem, Work done by a spring force (a variable force).	6
6.	**Potential Energy:** Potential energy of a system, Conservative and nonconservative forces, Conservation of mechanical energy, Changes in mechanical energy for nonconservative forces, Relationship between conservative forces and potential energy.	6
7.	**Center of Mass and Linear Momentum:** The Center of mass, Motion of a system of particles, Linear momentum and impulse, Conservation of linear momentum, Collisions in one dimension (Inelastic, Elastic). Collisions in two dimensions (Inelastic, Elastic).	8

8.	**Rotation:** Angular position, velocity and acceleration, Rotational kinematics; rotational motion with constant angular acceleration, Angular and linear quantities, Rotational kinetic energy, Calculation of moments of inertia, Torque, Relationship between torque and angular acceleration. Work, Power, and Energy in Rotational Motion. Rolling Motion of a Rigid Object. Rolling, Torque and angular momentum; The vector product and torque, Angular momentum, Angular momentum of a rotating rigid object. Conservation of angular momentum.	**10**
9.	**Equilibrium and Elasticity:** The conditions for equilibrium, The center of gravity, Examples of static equilibrium.	**4**
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Class Activities (class quizzes, homework, solving problems, etc.....)**	**weekly**	**20 %**
2.	**Midterm Exam 1**	**6thweek**	**20 %**
3.	**Midterm Exam 2**	**12thweek**	**20 %**
4.	**Final Exam**	**16thweek**	**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	- Serway R.A. and Jewett J.W., ***Physics for Scientists and Engineers with Modern Physics,*** 9th Edition, Brooks/Cole, Belmont, CA, USA (2014).
Supportive References	- Halliday D. and Resnick R., Physics, 9thEdition, John Wiley and sons (2011).
Electronic Materials	**https://units.imamu.edu.sa/colleges/en/science/Pages/default.aspx**
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	- **Classrooms.** - **Labs.**

Items	Resources
Technology equipment (projector, smart board, software)	- Classroom equipped with a whiteboard and a 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 - Second examiner	- Indirect (The students complete the evaluation forms at the end of term. Final exam is evaluated by the second examiner)
Effectiveness of Students assessment	- Instructors	- Direct (exams, HW, project, ...)
Quality of learning resources	- Faculty - Students	- Indirect (surveys)
The extent to which CLOs have been achieved	- Instructors - Program Leaders	- Direct (excel sheet)
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Quality Unit-Physics Department
REFERENCE NO.	Department council No. 06
DATE	26/09/2024