GE1360: INTRODUCTORY PHYSICS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Introductory Physics

Subject Code
GE - Gateway Education
Course Number
1360

Academic Unit
Physics (PHY)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

GE Area (Primary)
Area 3 - Science and Technology

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
PHY1400 Introductory Physics for Biologists

Part II Course Details

Abstract

This course covers a wide scope of topics in physics which are suitable for students who are interested in learning the concepts and techniques which physicists use to understand and analyse physical phenomena. Students will investigate the fundamentals of these topics and apply them to their understanding of different aspects of various physical phenomena. This course equips students with a broad knowledge in several important topics in physics; the depth and coverage are sufficient for the students to understand and appreciate physical phenomena and pursue further exploration or study in various topics of physics.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Recognize and use appropriately important technical terms and definitions relevant to the major topics in the course. Understand how experimental studies are carried out in physics		x		
2	Use appropriate mathematical notation to formulate and apply the physical laws covered in the course in concise form.		x		
3	Apply physics laws of mechanics, heat, gases, waves and optics to some physics problems.		x	x	
4	Solve real and hypothetical problems by identifying the underlying physics and analyzing the problem.		x	x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture	Explain key concepts and theory of topics of the course	1, 2, 3, 4	2 hrs/wk
2	Tutorial	Explain how some problems are solved and the techniques used; explain some concepts	1, 2, 3, 4	0.3 hrs/wk
3	Assignment	Practice solving problems	2, 3, 4	0.5 hrs/wk
4	Laboratory	Carry out an experimental study	1, 3	One 3 hrs lab

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4	28	
2	Lab	1	2	

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

2

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained

Assessment Rubrics (AR)

Assessment Task

1. Assignments

Criterion

1. Capacity for using physics knowledge and theory to solve physics problems
2. Demonstrate correct understanding of key concepts.

Excellent (A+, A, A-)

Will exhibit a high level of competence in understanding, explaining, and integrating the knowledge in written format

Good (B+, B, B-)

Will exhibit a good level of competence in understanding, explaining, and integrating the knowledge in written format

Fair (C+, C, C-)

Will exhibit a basic level of competence in understanding, explaining, and integrating the knowledge in written format

Marginal (D)

Will exhibit some deficiencies in understanding, explaining, and integrating the knowledge in written format

Failure (F)

Will exhibit lack of competence in understanding, explaining, and integrating the knowledge in written format

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Assessment Task

2. Lab

Criterion

1. Capacity for using physics knowledge in physics laboratory

Excellent (A+, A, A-)

Will exhibit a high level of competence in using the physics knowledge in laboratory

Good (B+, B, B-)

Will exhibit a good level of competence in using physics knowledge in laboratory

Fair (C+, C, C-)
Will exhibit a basic level of competence in using physics knowledge in laboratory

Marginal (D)
Will exhibit some deficiencies in using physics knowledge in laboratory

Failure (F)
Will exhibit a lack of competence in using physics knowledge in laboratory

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Assessment Task
2. Examination

Criterion
1. Capacity for using physics knowledge and theory to solve physics problems
2. Demonstrate correct understanding of key concepts and physics theory.

Excellent (A+, A, A-)
Will exhibit a high level of competence in understanding, explaining, and integrating the knowledge in written format

Good (B+, B, B-)
Will exhibit a good level of competence in understanding, explaining, and integrating the knowledge in written format

Fair (C+, C, C-)
Will exhibit a basic level of competence in understanding, explaining, and integrating the knowledge in written format

Marginal (D)
Will exhibit some deficiencies in understanding, explaining, and integrating the knowledge in written format

Failure (F)
Will exhibit lack of competence in understanding, explaining, and integrating the knowledge in written format

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Part III Other Information

Keyword Syllabus

- Mechanics: Vectors and scalars. Resolving forces. Newton’ s laws of motion. Conservation of energy. Moments and torques. Gravitation.
- Heat and gases: Temperature and heat. Heat capacity. Latent heat. Thermal expansion. Gas laws. Kinetic theory of gases.
- Waves: Traveling waves. Standing waves. Huygens’ construction. Interference, refraction and diffraction. Doppler effect.
- Optics: Reflection. Refraction. Lenses. Impact of incident light intensity and sensor size. Leuckart’ s law.

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	Young, H. and Freedman, R. (2012) “University Physics with Modern Physics” 13th Edition. Pearson, San Francisco.
2	Knudson, D. (2007). Fundamentals of Biomechanics. Springer
3	College Physics in Openstax website: https://openstax.org/subjects/science
4	University Physics in Openstax website: https://openstax.org/subjects/science

Annex (for GE courses only)

A. Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)

PILO 1: Demonstrate the capacity for self-directed learning

3

PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology

1, 2

PILO 3: Demonstrate critical thinking skills

4

PILO 4: Interpret information and numerical data

3, 4

PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation

3, 4

B. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task

Examination and marks distribution.