PHY1101: INTRODUCTORY CLASSICAL MECHANICS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Introductory Classical Mechanics

Subject Code
PHY - Physics
Course Number
1101

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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
HKDSE Physics or equivalent

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course introduces classical mechanics, covering topics related to kinematics, Newton's laws of motion, momentum, angular momentum, work, energy, motion of rigid body, etc. The course will be calculus based and serves as the first course for physics major. Basic calculus and vector analysis are introduced at the beginning. The goal of this course is to develop a conceptual understanding of core physics concepts, to make students familiar with the fundamental methodology of physics, and to provide a solid foundation for subsequent physics courses.

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		x		
2	Use appropriate mathematical notations and apply in concise form the laws of classical mechanics to the study of physics problems		x	x	
3	Apply the laws of classical mechanics to the study of modern physics problems		x	x	x
4	Solve real and hypothetical problems in classical mechanics 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	2 hrs/wk
2	Tutorial	Explain how some problems are solved and the techniques used explain some concepts	1, 2, 3, 4	1 hr/wk

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Homework, Quizzes etc.	1, 2, 3, 4	30	

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
Assignment

Criterion
Capacity for using physics knowledge and theory to solve problems
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
Examination

Criterion
Capacity for using physics knowledge and theory to solve problems
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 about experimental methods and the interpretation of results

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

Introduction to calculus and vector analysis
Kinematics
Newton’ s laws of motion; Gravity
Circular motion
Impulse and momentum
Work and energy
Motion of a rigid body
Angular momentum

Reading List

Compulsory Readings

	Title
1	Hugh D. Young and Roger A. Freedman, University Physics with Modern Physics (14th Edition), Pearson, 2015.

Additional Readings

	Title
1	Peter Dourmashkin, Classical Mechanics: MIT 8.01 Course Notes (available online at https://ocw.mit.edu/ans7870/8/8.01/f16/readings/MIT8_01F16_TableOfContents.pdf)
2	Hugh D. Young, Philip W. Adams, and Raymond J. Chastain, College Physics (10th Edition), Pearson, 2015.
3	Daniel Kleppner, Robert Kolenkow, An Introduction to Mechanics (2nd Edition), Cambridge, 2013.
4	David Morin, Introduction to Classical Mechanics: With Problems and Solutions (1st Edition), Cambridge, 2008.
5	A. P. French, M. G. Ebison, Introduction to Classical Mechanics (1st Edition), Kluwer Academic Press, 1986.