City University of Hong Kong
Course Syllabus

offered by Department of Physics
with effect from Semester A 2020/2021

Part I Course Overview

Course Title:	**Introductory Classical Mechanics**
Course Code:	**PHY1101**
Course Duration:	**1 semester**
Credit Units:	**3 credits**
Level:	**B1**
Proposed Area: *(for GE courses only)*	☐ Arts and Humanities ☐ Study of Societies, Social and Business Organisations ☐ Science and Technology
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**Nil**
Precursors: *(Course Code and Title)*	**HKDSE Physics or equivalent**
Equivalent Courses: *(Course Code and Title)*	**Nil**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II Course Details

1. Abstract

(A 150-word description about the course)

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.

While the course does not assume the students having calculus background, students are suggested to take MA1200/1201 simultaneously with this course.

Key words: kinematics, Newton's laws of motion, impulse and momentum, work and energy, angular momentum, motion of rigid body

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs[#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Recognize and use appropriately important technical terms and definitions		✓		
2.	Use appropriate mathematical notations and apply in concise form the laws of classical mechanics to the study of physics problems		✓	✓	
3.	Apply the laws of classical mechanics to the study of modern physics problems		✓	✓	✓
4.	Solve real and hypothetical problems in classical mechanics by identifying the underlying physics and analyzing the problem		✓	✓	✓
** If weighting is assigned to CILOs, they should add up to 100%.*		100%			

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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 self-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.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4			
Lecture	Explain key concepts and theory of topics of the course	✓	✓	✓				2 hrs/wk
Tutorial	Explain how some problems are solved and the techniques used explain some concepts	✓	✓	✓	✓			1 hr/wk

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: 30%								
Homework, Quizzes etc.	✓	✓	✓	✓			30%	
Examination: 70% (duration: 2 hours)								
Examination	✓	✓	✓	✓			70%	
** The weightings should add up to 100%.*							100%	

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

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignment	1. Capacity for using physics knowledge and theory to solve problems 2. Demonstrate correct understanding of key concepts.	Will exhibit a high level of competence in understanding, explaining, and integrating the knowledge in written format	Will exhibit a good level of competence in understanding, explaining, and integrating the knowledge in written format	Will exhibit a basic level of competence in understanding, explaining, and integrating the knowledge in written format	Will exhibit some deficiencies in understanding, explaining, and integrating the knowledge in written format	Will exhibit lack of competence in understanding, explaining, and integrating the knowledge in written format
2. Examination	1. Capacity for using physics knowledge and theory to solve problems 2. Demonstrate correct understanding of key concepts and physics theory.	Will exhibit a high level of competence in understanding, explaining, and integrating the knowledge in written format	Will exhibit a good level of competence in understanding, explaining, and integrating the knowledge in written format	Will exhibit a basic level of competence in understanding, explaining, and integrating the knowledge in written format	Will exhibit some deficiencies in understanding about experimental methods and the interpretation of results	Will exhibit lack of competence in understanding, explaining, and integrating the knowledge in written format

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

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

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

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

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

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.