City University of Hong Kong
Course Syllabus

offered by Department of Physics
with effect from Semester A 2018/19

Part I Course Overview

Course Title:	**Introductory Physics for Biologists**
Course Code:	**PHY1400**
Course Duration:	**One semester**
Credit Units:	**3**
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)*	**Nil**
Equivalent Courses: *(Course Code and Title)*	**AP1400 Introductory Physics for Biologists**
Exclusive Courses: *(Course Code and Title)*	**Nil**

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course covers a wide scope of topics in physics relevant to medical and veterinary programs including biomechanics, heat, gases, wave and optics in both physiological and pathological contexts. Students will investigate the fundamentals of these topics and become able to apply them to achieve understanding of aspects of musculoskeletal functioning, thermoregulation, sensory perception and imaging technologies. This course equips students with a broad knowledge in several important topics in biophysics and the depth and coverage are sufficient for the students to pursue later studies in physiology, imaging technologies, pathology, and orthopaedic surgery.

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 relevant to the major topics in the course.	-	√		
2.	Use appropriate mathematical notation to formulate and apply the physical laws covered in the course in concise form.	-	√		
3.	Apply physics laws of mechanics, heat, gases, waves and optics in medical and veterinary situations.	-	√	√	
4.	Solve real and hypothetical problems by identifying the underlying physics and analyzing the problem.	-	√	√	√
** If weighting is assigned to CILOs, they should add up to 100%.*		-			

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 hrs/wk
Assignment	Practice solving problems		√	√	√	
Laboratory	Set up the experiment, carry out some measurement and analyse the results with the relevant theory; students learn experimental skills, analysis methods and data presentation skills			√	√	3 hours every third week

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%								
Assignments	√	√	√	√			20%	
Laboratory reports	√		√	√			10%	
Examination^: 70% (duration: 2 hours, if applicable)								
** 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. Assignments	1. Capacity for using physics knowledge and theory to solve biomedical 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. Laboratory reports	1. Demonstrate capacity of setting up the required experiments 2. Demonstrate capacity of carrying out proper measurement 3. Demonstrate correct understanding of the experimental results	Will exhibit a high level of understanding about experimental methods and the interpretation of results	Will exhibit a good level of understanding about experimental methods and the interpretation of results	Will exhibit a basic level of understanding about experimental methods and the interpretation of results	Will exhibit some deficiencies in understanding about experimental methods and the interpretation of results	Will exhibit lack of understanding about experimental methods and the interpretation of results

3. Examination	1. Capacity for using physics knowledge and theory to solve biomedical 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, explaining, and integrating the knowledge in written format	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.)

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.

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.)

N/A

2.2 Additional Readings

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

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