City University of Hong Kong
Course Syllabus

offered by Department of Physics
with effect from Semester B 2020/21

Part I Course Overview

Course Title:	**Modern Topics in Engineering and Applied Physics**
Course Code:	**PHY6505**
Course Duration:	**One Semester**
Credit Units:	**3**
Level:	**P6**
Medium of Instruction:	**English**
Medium of Assessment:	**English**
Prerequisites: *(Course Code and Title)*	**None**
Precursors: *(Course Code and Title)*	**AP3251/PHY3251 Quantum Physics or equivalent**
Equivalent Courses: *(Course Code and Title)*	**None**
Exclusive Courses: *(Course Code and Title)*	**PHY8505 Modern Topics in Engineering and Applied Physics**

Part II Course Details

1. Abstract

The aim of the course is to provide students with an introduction to contemporary topics in Applied Physics with technological relevance. The topics match the current research themes of the physics department, including atomic, molecular, and optical physics; low-dimensional systems; soft matter and biophysics; spectroscopy and imaging; theoretical and computational physics.

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.	Be aware of the current development in selected areas in Applied Physics.	50	√	√	
2.	Be able to conduct literature research in selected areas in Applied Physics.	50	√	√	
		100%			

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	
Lectures	Provide theories, concepts, examples of modern topics in Applied Physics	√	√	
Students' presentation	The students will have to select a recent topic in Applied Physics and present it to the class.	√	√	

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		
Continuous Assessment: 100%				
Quizzes	√		20%	
Presentation	√	√	40%	
Final report	√	√	40%	
			100%	

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. Quizzes	Demonstrating the understanding of the course materials.	High	Significant	Moderate	Basic	Not reaching marginal level
2. Presentation	Understanding the background and development of the selected topics in applied physics; Identifying the current challenges.	High	Significant	Moderate	Basic	Not reaching marginal level
3. Final report	Understanding the background and development of the selected topics in applied physics; Identifying the current challenges.	High	Significant	Moderate	Basic	Not reaching marginal level

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.)

The topics match the current research themes of the physics department, including atomic, molecular, and optical physics; low-dimensional systems; soft matter and biophysics; spectroscopy and imaging; theoretical and computational physics.

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.)

None.

2.2 Additional Readings

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

1.	Claude Cohen-Tannoudji, Bernard Diu and Franck Laloe, Quantum Mechanics Vols. I and II, John Wiley and Sons 1977.
2.	Richard P. Feynman, *Feynman Lectures on Physics vol. III*, Addison Wesley 1965.
3.	Scott Aaronson, *Quantum Computing Since Democritus*, Cambridge University Press 2013.
4.	Yanhua Shih, An Introduction to Quantum Optics – Photon and Biphoton Physics, CRC Press, 2011.
5.	Girish S. Agarwal, Quantum Optics, Cambridge University Press, 2013.
6.	Michael Rubinstein and Ralph H. Colby, Polymer Physics, OUP Oxford, 2003.
7.	Topological Aspects of Condensed Matter Physics: Lecture Notes of the Les Houches Summer School: Volume 103, August 2014, DOI: 10.1093/acprof:oso/9780198785781.001.0001.