

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Physics  
with effect from Semester A 2019 /20**

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**Part I Course Overview**

**Course Title:** Advanced Imaging Physics

**Course Code:** PHY6522

**Course Duration:** One semester

**Credit Units:** 3

**Level:** P6

**Medium of Instruction:** English

**Medium of Assessment:** English

**Prerequisites:**  
(Course Code and Title) NA

**Precursors:**  
(Course Code and Title) NA

**Equivalent Courses:**  
(Course Code and Title) NA

**Exclusive Courses:**  
(Course Code and Title) PHY8522 Advanced Imaging Physics

## Part II Course Details

### 1. Abstract

This course will advance understanding of X-ray imaging, which is the most widely used form of medical imaging. Also, this course will advance understanding of prominent imaging methods such as magnetic resonance imaging and ultrasonography.

### 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.	X-ray physics relevant to medical imaging and key imaging concepts.	50		✓	
2.	Applications of x-rays in medical imaging.	25		✓	
3.	Physical principles of magnetic resonance imaging, ultrasonography, and other prominent medical imaging methods along with applications.	25		✓	
		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	3	4	
Lectures	Presentation of course material	13	7	6		2
Tutorials	Review of course material	7	3	3		1

### 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: <u>30%</u>						
Monthly assignments	15	7	8		30	
Final examination	35	17	18		70	
Examination: <u>70%</u> (duration: 2 hours)						
					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. Examination	Score out of 100	90 - 100	70 - 89	40 - 69	30 - 39	< 30
2. Assignments	Score out of 100	90 - 100	70 - 89	40 - 69	30 - 39	< 30

**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.)*

X-ray physics and imaging concepts:

- Scattering, absorption
- X-ray production, attenuation, and detection
- Dose
- Resolution, contrast, signal-to-noise, field of view, dynamic range, artifacts

X-ray imaging methods:

- Planar x-ray
- Computed tomography
- Angiography

Other imaging methods:

- Ultrasonography
- Magnetic resonance imaging

**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.	
2.	
3.	
...	

**2.2 Additional Readings**

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

1.	Radiation Physics for Medical Physicists
2.	
3.	
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