City University of Hong Kong
Course Syllabus

offered by College/School/Department of Physics
with effect from Semester A 2025/26

Part I   **Course Overview**

Course Title: **Data Acquisition and Processing Skills for Physicists I**

Course Code: **PHY5504**

Course Duration: **One semesters**

Credit Units: **3 credits**

Level: **P5**

Medium of Instruction: **English**

Medium of Assessment: **English**

Prerequisites:
(Course Code and Title)

Precursors:
(Course Code and Title)

Equivalent Courses:
(Course Code and Title)

Exclusive Courses:
(Course Code and Title)

Part II   Course Details

1.   Abstract

The primary aim of this course is to equip physics students with fundamental skills in data acquisition and processing, thereby enhancing their ability to confidently handle diverse data sources. These skills are essential for modern physicists who must be adept not only in theoretical calculations but also in the practical aspects of data handling. Students will learn to utilize various computer programming languages, with a focus on Python, which is renowned for its efficiency and ease of use in scientific computing. Additionally, the course will cover the use of various hardware tools for data collection, including but not limited to microcontrollers like Arduino, sensors, and real-time data processing units. The students are expected to finish several mini-projects on data acquisition and processing.

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 able to acquire data from different sources	50	√	√	
2.	Be able to process big data sets	50	√	√	

* If weighting is assigned to CILOs, they should add up to 100%.   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.   Learning and Teaching Activities (LTAs)
(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.		Hours/week(if applicable)
		1	2	
Lectures	Presentation of course material	√	√	3 Hours
Projects	The students will complete several mini-projects related to data acquisition and processing.	√	√	
Presentations/exhibition	The students will showcase projects.	√	√	

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_%								
Presentations/exhibition	√	√					100%	
Examination: _0_%								

* The weightings should add up to 100%. | 100% |

5. Assessment Rubrics

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

Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Presentations/exhibition	Demonstrating the capability in data acquisition and processing.	High (excellent accomplishment with creativity and correct understanding)	Significant (good accomplishment with mostly correct understanding)	Moderate (fair accomplishment with some correct understanding)	Basic (essential accomplishment with basic understanding)	Not reaching marginal level

Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Presentations/exhibition	Demonstrating the capability in data acquisition and processing.	High (excellent accomplishment with creativity and correct understanding)	Significant (good accomplishment with mostly correct understanding)	Moderate (fair accomplishment with some correct understanding)	Basic (essential accomplishment with basic understanding)

Part III ther Information

1. **Keyword Syllabus**

    - Introduction to Data
    - Data Acquisition
    - Data format, Database, Data acquisition hardwires, e.g., Arduino.
    - Data Processing
    - Data processing program languages, e.g., MATLAB, Python, Data Visualization, e.g., Matplotlib.

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.)

    None