PHYS3153 Methods of Experimental Physics II
Course Outline- Fall 2024

1. **Instructor(s)**

Name: Ophelia TSUI
Contact Details: Rm. 4455, Tel: 34692671, okctsui@ust.hk

2. **Teaching Assistant(s)**

Name: Man Fai Jerry LIU
Contact Details: Rm. 4469, Tel: 23587528, phymfliu@ust.hk

Name: Chen CHEN
Contact Details: PG hub, Tel: N/A, cchencx@connect.ust.hk

Name: Luanjing LI
Contact Details: Rm. 2237, Tel: N/A, llied@connect.ust.hk

Name: Chenxuan LOU
Contact Details: Rm. 4130, Tel: N/A, clouaa@connect.ust.hk

Name: Xiaolin REN
Contact Details: Rm. 3118A, Tel: N/A, xrenaj@connect.ust.hk

Name: Wentao TANG
Contact Details: PG hub, Tel: N/A, wtangam@connect.ust.hk

Name: Chang XU
Contact Details: Rm. 4142, Tel: N/A, cxubj@connect.ust.hk

3. **Meeting Time and Venue – Lectures, Tutorials/ Laboratory**

Lectures:

Date/Time: Monday (10:00 – 10:50)

Venue: Rm. 6602

Lab 1:

Date/Time: Tuesday and Thursday (9:30-11:20)

Venue: Room 6135

Lab 2:

Date/Time: Tuesday and Thursday (15:00-16:50)

Venue: Room 6135

Lab 3:

Date/Time: Monday (14:00-15:50) and Friday (9:30-11:20)

Venue: Room 6135

Lab 4:

Date/Time: Monday and Tuesday (11:00-12:50)

Venue: Room 6135

4. Course Description

Credit Points: 3
Pre-requisites: (PHYS 1114 or PHYS 1314) and PHYS 2023
Exclusion: NIL

Brief Information/synopsis:

This laboratory course aims to familiarize students with concepts and practice of science inquiry in the context of experimentation. It emphasizes acquisition of good laboratory techniques in three crucial areas of experimental physics, namely usage of modern instrumentation, careful logging of experimental data, and proper analysis of data. In this course, students are required to do five optics experiments, including interferometry, spectroscopy, scattering, diffraction, fiber optics, and laser diodes. While the experiments will unlikely bring about new physics, they are intended to help students develop understandings of the operating principles and applications of modern laboratory methods.

5. Intended Learning Outcomes

No.	ILOs
1	Understand how electromagnetic theories are used in contemporary technological applications

2	Practice or understand basic laboratory techniques in the use of modern instrumentation.
3	Carry out systematic data logging in laboratory notebook.
4	Perform statistical analysis of data using professional software.
5	Evaluate the success of experiments.
6	Summarize the results in technical reports.

In addition, students should be able to:

1. Explain basic theories in geometrical optics.
2. Perform experiments to study the wave nature of light.
3. Measure the transmission of light in wave guides and optical fibers.
4. Perform spectral analysis of light using spectrometers.
5. Measure light emission from laser diodes.

6. Assessment Scheme

Assessment	Assessing Course ILOs
15% by lab performance	*1, 2, 3, 4, 5*
36% by lab notebook	*2, 3, 4*
30% by lab report	*1, 4, 5, 6*
13% by presentation	*1, 4, 5*
6% by lecture attendance	*1, 2*

7. Student Learning Resources

Text: The laboratory manual serves as the text of this course.

Recommended Reading: Lecture notes and the book by R. A. Dunlap, *Experimental Physics*, ISBN 0-19-504949-7 (Oxford University Press, UK, 1988).

8. Teaching and Learning Activities -

Scheduled activities per week: 4 hrs (lecture + labs)

9. Course Schedule

Two weeks on each of the following experiments:

O1. Basic optical systems

O2. Application of interferometry

O3. Waveguides and optical fibers

O4. Application of optical spectroscopy

O5. Semiconductor laser diodes