

PHYS4051 Quantum Mechanics II

Course Outline- Fall 2022

1. Instructor(s)

Name: Kam Tuen LAW

Contact Details: phlaw@ust.hk

2. Teaching Assistant(s)

Name: Ziting Sun

Contact Details: zsunaw@connect.ust.hk

3. Meeting Time and Venue

Lectures:

Date/Time: Wednesday and Friday (15:00 – 16:20)

Venue: Classroom 2504

4. Course Description

Credit Points: 3

Pre-requisite: PHYS 3031/MATH 4052, AND PHYS 3036/PHYS 3037

Exclusion: NIL

Brief Information/synopsis:

This course is mainly on approximation methods in quantum mechanics. Topics include stationary state perturbation theory, variational principle, WKB method, time-dependent perturbation theory, emission and absorption of radiation, adiabatic approximation and geometric phase, scattering theory.

5. Intended Learning Outcomes

Upon successful completion of this course, students should be able to:

No.	ILOs
1	Recognize and use appropriately important technical terms and definitions.
2	Use mathematical notations to formulate and apply the laws in concise form.
3	Apply physics laws of quantum mechanics in familiar situations.
4	Solve real and hypothetical problems by identifying the underlying physics and analyzing the problem.

6. Assessment Scheme

- Examination duration: midterm 80mins, final 3 hrs
- Percentage of coursework, examination, etc.:

Assessment

15% by homework
15% by presentation
70% by exam

Assessing Course ILOs

1, 2, 3
4
1, 2, 3, 4

- The grading is assigned based on students' performance in assessment tasks/activities.

7. Student Learning Resources

Recommended Reading:

Text(s):

R Shankar, "Principles of Quantum Mechanics", Springer.

D J Griffiths, "Introduction to Quantum Mechanics", Cambridge University Press.

J J Sakurai, "Modern Quantum Mechanics", Cambridge University Press.

8. Teaching and Learning Activities

Scheduled activities: 160 mins (lecture)

9. Course Schedule

Keyword Syllabus:

- Orbital Angular Momentum
- Spin Angular Momentum
- Addition of Angular Momentum
- Tensor products
- Time-independent Perturbation Theory
- Time-dependent Perturbation
- Scattering problem
- Berry phase
- Band Structure