Course Code	PHYS8351 (RPG)		
Title	Graduate quantum mechanics		
Offering Department	Physics		
Course Co-ordinator	Prof S Q Shen Physics		
Course Co-ordinator Email	sshen@hku.hk		
Teachers Involved	Name	Department	Percentage
	Prof S Q Shen	Physics	100
Course Objectives	This course introduces postgraduates to theory and advanced techniques in quantum mechanics, and their applications to selected topics in condensed matter physics.		
Course Contents & Topics	The course covers the following topics: Dirac notation; quantum dynamics; the second quantization; symmetry and conservation laws; permutation symmetry and identical particles; perturbation and scattering theory; introduction of relativistic quantum mechanics.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 formulate and solve problems in quantum mechanics using Dirac notation CLO 2 examine and predict the properties of identical quantum particles CLO 3 argue the importance of symmetry and conservation laws in quantum mechanics CLO 4 explain physical phenomena in the modern language of quantum mechanics CLO 5 analyse physical system in a quantum mechanical way CLO 6 recognise the connection between relativity and quantum mechanics		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 1st sem	Examination	Dec
Course Grade	A+ to F		
Grade Descriptors	A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.		

	Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.		
Course Type	Lecture-based elective course		
Course Teaching & Learning Activities	Activities	Details	No. of Hours
	Lectures		36
	Tutorials		12
	Reading/Self study		80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)
	Assignments		20
	Examination	3-hour written exam	50
	Test		30
Quota	9999 (9999 if no quota)		
Required/recommended reading and online materials	Lecture notes provided by Course Coordinator J. J. Sakurai: Modern Quantum Mechanics (Addison-Wesley, 1994) L. I. Schiff: Quantum Mechanics (McGraw-Hill, 1968)		