

Course Code	PHYS8550 (RPG)		
Title	Graduate statistical mechanics		
Offering Department	Physics		
Course Co-ordinator	Dr K M Lee Physics		
Course Co-ordinator Email	kmlee1@hku.hk		
Teachers Involved	Name	Department	Percentage
	Dr K M Lee	Physics	100
Course Objectives	This course covers advanced topics in equilibrium statistical physics.		
Course Contents & Topics	Topics include: Ensemble theory; theory of simple gases, ideal Bose systems, ideal Fermi systems; statistical mechanics of interacting systems; statistical field theory; some topics in the theory of phase transition may be selected.		
Course Learning Outcomes (CLO)	<p>On successful completion of this course, students should be able to:</p> <p>CLO 1 discuss the various classical ensembles and quantum ensembles</p> <p>CLO 2 solve the statistical mechanics problems using ensemble theory</p> <p>CLO 3 explain the connection between classical statistical mechanics and quantum statistical mechanics</p> <p>CLO 4 understand the phase transition, criticality, symmetry breaking, renormalization</p>		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2024 - 2025	Y 2nd sem	Examination	May
Course Grade	Pass or Fail		
Grade Descriptors	<p>Pass: 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.</p> <p>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.</p>		
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		50
	Examination	3-hour written exam	50

Quota	9999 (9999 if no quota)
Required/recommended reading and online materials	Lecture notes provided by Course Coordinator Kerson Huang: Statistical Mechanics (2nd Edition, Wiley) R.K. Pathria: Statistical Mechanics M. Plischke and B. Bergersen: Equilibrium Statistical Physics Kardar: Statistical Physics of fields Parisi: Statistical field theory