Course list for Cross-Institutional Course Enrolment (Semester 2, 2025/26)

Faculty of Science
The University of Hong Kong

Last update: November 20, 2025

Course Code	Course Title	Level (RPG/TPG)	Pre-requisites	Class Dates	Class Time	Venue	Quota for Non-HKU Students (if any)	Course Syllabus URL	Contact Information (Name & Email)	Remarks (Please specify if the medium of instruction is NOT English)
EASC6011	The Art of Scientific Presentations	RPG	Nil	Jan 22, 2026 Feb 12, 2026 Mar 5, 2026 Mar 26, 2026 Apr 16, 2026 (Thursdays)	14:00 - 15:50	MBG07	Nil	https://www.earthsciences.hku.hk/education/postgraduate_students/research_postgraduates/coursework_requirement/	Prof. LI Weiran weiranli@hku.hk	Nil
PHYS8352	Quantum Information	RPG	Nil	Jan 19 - Apr 30, 2026	09:00 - 10:50 (Mon) 09:00 - 09:50 (Thu)	MB100 (Mon) MW325 (Thu)	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil
PHYS8450	Graduate Electromagnetic Field Theory	RPG	Nil	Jan 20 - Apr 30, 2026	09:00 - 09:50 (Tue) 10:00 - 11:50 (Thu)	KKLG101 (Tue) MB121 (Thu)	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil
PHYS8550	Graduate Statistical Mechanics	RPG	Nil	Jan 19 - Apr 30, 2026	13:00 - 14:50 (Mon) 15:00 - 15:50 (Thu)	KKLG105 (Mon) MWT6 (Thu)	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil

PHYS8552	Condensed Matter Physics	RPG	Nil	Jan 20 - Apr 28, 2026	13:00 - 15:50 (Tue)	MB121	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil
PHYS8656	Topics in astrophysics	RPG	Nil	Jan 20 - Apr 28, 2026	12:00 - 12:50 (Tue) 13:00 - 14:50 (Fri)	KKLG110	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil
PHYS8701	Physics Experimental Techniques	RPG	Nil	Jan 21 - Apr 29, 2026	14:00 - 16:50 (Wed)	MW103	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil
PHYS8751	Device Physics	RPG	Nil	Jan 20 - Apr 28, 2026	10:00 - 10:50 (Tue) 10:00 - 11:50 (Fri)	KKLG101 (Tue) LE2 (Fri)	Nil	https://www.physics.hku.hk/graduate_studies/for_research_postgraduate/course_Information/	Ms. Carfulin Tam carfulin@hku.hk	Nil
BIOL6009	Advanced studies in Ecology & Biodiversity for Postgraduate Students	RPG	RPG	N/A	N/A	N/A	N/A	http://www.biosch.hku.hk/course/RPGmodules.html	Ms. Flora Chan ppchan@hku.hk	Student will select BSc course in SBS and SBS will notify the corresponding timetable

EASC6011 The Art of Scientific Presentations		Academic Year	2025 - 26
Offering Department	Earth and Planetary Sciences	Compulsory (C)/ Elective (E)	E
Course Co-ordinator	Prof. Weiran Li, Earth Sciences (weiranli@hku.hk)		
Teachers Involved	Prof. Weiran Li, Earth Sciences (weiranli@hku.hk)		
Course Objectives	This course aims to help earth science students to improve their presentation skills by introducing practical tips for oral-poster presentations and providing constructive feedback to individual students' presentations on research topics in earth sciences.		
Course Contents & Topics	Principles of oral-poster presentation design; Practice and peer evaluations of presentations; Participation at earth science conferences		
Course Learning Outcomes	On successful completion of this course, students should be able to: (1) understand basic presentation concepts and the significance of developing presentation skills (2) practice and improve talk/poster presentations on earth science topics (3) provide constructive feedback to other students' presentations on earth science topics (4) apply the knowledge and feedback acquired from this course to future presentations and participation at earth science conferences		
Pre-requisites (and Co-requisites and Impermissible combinations)	N/A		
Offer in 2025 - 26	Yes 2nd sem	Examination	No Exam
Offer in 2026 - 27	Yes		
Course Grade	A+ to F		

Grade Descriptors		
	A	The student achieves great improvements on presentation skills, actively participates in all discussions and peer evaluations, and delivers an outstanding oral presentation.
	B	The student achieves moderate improvements on presentation skills, actively participates in most discussions and peer evaluations, and delivers a good oral presentation.
	C	The student achieves some improvements on presentation skills, participates in at least 50% discussions and peer evaluations, and delivers an average oral presentation.
	D	The student achieves limited improvements on presentation skills, participates in a small proportion of discussions and peer evaluations, and delivers an unsatisfying oral presentation.
	F	The student lacks improvements on presentation skills, lacks participation in discussions and peer evaluations, and fails to deliver an oral presentation.

Course Type	Lecture-based
Course Teaching & Learning Activities	

Activities	Details	No. of Hours
Lectures	Introducing the principles and tips for oral/poster presentations and participations at earth science conferences	8
Project work	Practicing presentations and conducting peer evaluations in groups	20

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Assignment	Participation in group discussion, peer evaluation, and presentations	100%

Required/recommended reading and online materials	Alley, Michael. The Craft of Scientific Presentations : Critical Steps to Succeed and Critical Errors to Avoid. New York: Springer, 2003. Duarte, Nancy. HBR Guide to Persuasive Presentations. Boston, Mass: Harvard Business Review Press, 2012.
Additional Course Information	This course is for RPg students of all faculties of HKU and other UGC-funded universities.

Course Code	PHYS8352 (RPG)		
Title	Quantum information		
Offering Department	Physics		
Course Co-ordinator	Prof H F Chau Physics		
Course Co-ordinator Email	hfchau@hku.hk		
Teachers Involved	Name	Department	Percentage
	Prof H F Chau	Physics	100
Course Objectives	This course covers the theory of quantum information and computation and its applications in physics and computer science.		
Course Contents & Topics	Topics include: Quantum computer; quantum algorithms; quantum error correction; quantum information processing; quantum entanglement and quantum cryptograph.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 examine the advantage and disadvantage of quantum computing over classical computing CLO 2 explain the inner workings of common quantum algorithms and quantum key distribution CLO 3 analyze the performance of quantum algorithms and quantum error correction codes CLO 4 apply quantum information techniques to solve problems in physics and computer science		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 2nd sem	Examination	May
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	2-hour written exam	50
	Test		30
Quota	9999 (9999 if no quota)		
Required/recommended reading and online materials	Lecture notes provided by Course Coordinator M A Nielsen and I L Chuang: Quantum Computation And Quantum Information (CUP, 2000) V Vedral: Introduction To Quantum Information Science (OUP, 2006) B. Schumacher & M. Westmoreland: Quantum Processes Systems, & Quantum Information (CUP, 2010) M. M. Wilde: Quantum Information Theory (CUP, 2017, 2nd ed.) J. J. G. Ripoll: Quantum Information & Quantum Optics With Superconducting Circuits (CUP, 2022) H.-A. Bachor & T. C. Ralph: A Guide To Experiments In Quantum Optics (Wiley-VCH, 2019, 3nd ed.)		

Course Code	PHYS8450 (RPG)		
Title	Graduate Electromagnetic Field Theory		
Offering Department	Physics		
Course Co-ordinator	Prof Yuxin Zhao Physics		
Course Co-ordinator Email	yuxinphy@hku.hk		
Teachers Involved	Name	Department	Percentage
	Prof Yuxin Zhao	Physics	100
Course Objectives	The aim of this course is to provide students with the advanced level of comprehending on the theory of classic electromagnetic field, enabling them to master key analytical tools for solving real physics problems.		
Course Contents & Topics	This course will introduce and discuss the following topics: Boundary-value problems in electrostatics and Green's Function method; electrostatics of media; magnetostatics; Maxwell's equations and conservation laws; gauge transformations; electromagnetic waves and wave guides.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 analyse and solve various electrostatic and magnetostatic problems with Green's Function CLO 2 comprehend and explain many electromagnetic phenomena CLO 3 recognise and comprehend the important concepts of conservation laws and gauge transformations, which should be very helpful for doing research in future		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 2nd sem	Examination	May
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		40
	Examination	3-hour written exam	50
	Test		10
Quota	9999 (9999 if no quota)		
Required/recommended reading and online materials	J.D. Jackson: Classical Electrodynamics (John Wiley & Sons, 1999) L.D. Landau and E.M. Lifshitz: Classical Theory of Fields (Pergamon, 1982)		

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)	On successful completion of this course, students should be able to: CLO 1 discuss the various classical ensembles and quantum ensembles CLO 2 solve the statistical mechanics problems using ensemble theory CLO 3 explain the connection between classical statistical mechanics and quantum statistical mechanics CLO 4 understand the phase transition, criticality, symmetry breaking, renormalization		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 2nd sem	Examination	May
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		50
	Examination	2-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		

Course Code	PHYS8552 (RPG)		
Title	Condensed Matter Physics		
Offering Department	Physics		
Course Co-ordinator	Prof Shizhong ZHANG		
Course Co-ordinator Email	shizhong@hku.hk		
Course Objectives	This course introduces many-body physics in quantum matter. Systems consisting of many particles (bosons or fermions) display novel collective phenomena that individual particles do not have, for example, ferromagnetism and superfluidity. It aims to introduce students the general principles behind these phenomena, such as elementary excitations, spontaneous symmetry breaking, adiabatic theorems, emergent topological phases of matter, etc. Theoretical language useful in the interpretation of experiments, such as linear response theory and response functions, will be discussed. This course is intended for both experimentalists and theorists. While there are no official prerequisites, students who would like to take this course are assumed to have sufficient knowledge on quantum mechanics and statistical mechanics.		
Course Contents & Topics	This course will focus on the phenomena of emergent many-body states that require not only the effect of quantum statistics but also that of inter-particle interaction. Examples include: Ferromagnetism, Fermi liquid, superfluidity, superconductivity, and the quantum Hall states. Some general themes related to these quantum states, such as elementary excitation, Ginzburg-Landau description, spontaneous symmetry breaking, and topological phases of matter will be discussed.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 understand the general principle of spontaneous symmetry breaking CLO 2 understand the basic properties of superfluidity and superconductivity and their Ginzburg-Landau descriptions CLO 3 understand the many-body phenomena based on many-body wave functions and can describe the elementary excitations on top of it CLO 4 apply response function formalism to understand simple experiments and carry out analysis based on analytic properties of response functions CLO 5 understand the basics of quantum Hall effects		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL		
Offer in 2025 - 2026	Y 2nd sem	Examination	No Exam
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.		

<table>
<tr><td></td><td colspan="3">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.</td></tr>
<tr><td>Course Type</td><td colspan="3">Lecture-based elective course</td></tr>
<tr><td rowspan="4">Course Teaching & Learning Activities</td><td>Activities</td><td>Details</td><td>No. of Hours</td></tr>
<tr><td>Lectures</td><td></td><td>36</td></tr>
<tr><td>Tutorials</td><td></td><td>12</td></tr>
<tr><td>Reading/Self study</td><td></td><td>80</td></tr>
<tr><td rowspan="3">Assessment Methods and Weighting</td><td>Methods</td><td>Details</td><td>Weighting in final course grade (%)</td></tr>
<tr><td>Assignments</td><td></td><td>40</td></tr>
<tr><td>Essay</td><td></td><td>60</td></tr>
<tr><td>Required/recommended reading and online materials</td><td colspan="3">James F. Annett, Superconductivity, Superfluids, and Condensates, Oxford, 2004
D. Pines and N. Nozieres, Theory of Quantum Liquids, in two volumes, Westview Press, 1994
A.J. Leggett, Quantum Liquids, Oxford, 2006
P. Chaikin and T. Lubensky, Principles of Condensed Matter Physics, Cambridge, 2000
M. Tinkham, Introduction to Superconductivity, 2nd Edition, Dover, 1996
P. de. Gennes, Superconductivity of Metals and Alloys, Westview Press, 1999
D. Yoshioka, The Quantum Hall Effect, Springer, 2002
R.E. Prangle and S. Girvin, The Quantum Hall Effect, Springer, 1989
J.K. Jain, Composite Fermions, Cambridge, 2007
X.-G. Wen, Quantum Field Theory of Many-Body Systems: From the Origin of Sound to an Origin of Light and Electrons, Oxford Graduate Texts, 2007</td></tr>
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Course Code	PHYS8656 (RPG)		
Title	Topics in astrophysics		
Offering Department	Physics		
Course Co-ordinator	Dr S C Y Ng Physics		
Course Co-ordinator Email	ncy@astro.physics.hku.hk		
Teachers Involved	Name	Department	Percentage
	Dr S C Y Ng	Physics	100
Course Objectives	This course covers high energy processes, basic theory of stellar structure and evolution, and introduction to compact objects. It follows a vigorous mathematical treatment that stresses on the underlying physical processes.		
Course Contents & Topics	Topics include: Radiation mechanisms; stellar structure equations; polytropic model; elementary stellar radiation processes; simple stellar nuclear processes; stellar formation; late stage of stellar evolution; supernova explosion; compact stellar; cosmic rays; if time permits, additional selected topics will be covered.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 describe what is stars and to classify different types of stars CLO 2 analytically calculate and solve problems related to the structure and evolution of stars including the use of stellar structure equations and Saha equations CLO 3 critically examine the physical processes occurring in stars and how these processes affect the evolution of stars CLO 4 apply physics principles to describe the physical properties of various astrophysical systems CLO 5 demonstrate knowledge and discuss the underlying physical concepts associated with the astrophysical systems and their dynamic interactive processes CLO 6 assess selected research papers in the field of stellar astrophysics		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 2nd sem	Examination	May
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		

<table>
<tr><td></td><td colspan="3">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.</td></tr>
<tr><td>Course Type</td><td colspan="3">Lecture-based elective course</td></tr>
<tr><td rowspan="4">Course Teaching & Learning Activities</td><td>Activities</td><td>Details</td><td>No. of Hours</td></tr>
<tr><td>Lectures</td><td></td><td>36</td></tr>
<tr><td>Tutorials</td><td></td><td>12</td></tr>
<tr><td>Reading/Self study</td><td></td><td>80</td></tr>
<tr><td rowspan="5">Assessment Methods and Weighting</td><td>Methods</td><td>Details</td><td>Weighting in final course grade (%)</td></tr>
<tr><td>Assignments</td><td></td><td>10</td></tr>
<tr><td>Examination</td><td>2-hour written exam</td><td>50</td></tr>
<tr><td>Presentation</td><td></td><td>10</td></tr>
<tr><td>Test</td><td></td><td>30</td></tr>
<tr><td>Quota</td><td colspan="3">9999 (9999 if no quota)</td></tr>
<tr><td>Required/recommended reading and online materials</td><td colspan="3">Lecture notes provided by Course Coordinator
Prialnik, D.: An introduction to the theory of stellar structure and evolution, 2nd ed. (CUP, 2010)
Shapiro and S. A. Teukolsky Longair High Energy Astrophysics 3rd ed
Francis, LeBlanc, An Introduction to Stellar Astrophysics (Wiley, 2010)</td></tr>
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Course Code	PHYS8701 (RPG)		
Title	Physics experimental techniques		
Offering Department	Physics		
Course Co-ordinator	Prof M H Xie Physics		
Course Co-ordinator Email	mhxie@hku.hk		
Teachers Involved	Name	Department	Percentage
	Prof M H Xie	Physics	10
	Prof X D Cui	Physics	7.5
	Prof S Zhang	Physics	7.5
	Prof F C C Ling	Physics	7.5
	Prof D K Ki	Physics	7.5
	Prof T T Luu	Physics	15
	Prof J H C Lee	Physics	7.5
	Prof Y J Tu	Physics	7.5
	Prof Y Yang	Physics	7.5
	Prof J Zhou	Appl. Phys., PolyU	7.5
	Prof C Liu	Physics, SUSTech	7.5
Course Objectives	This course provides a detailed account of some common experimental techniques in physics research. It introduces the basic working principles, the operational knowhow, and the strength and limitations of the techniques.		
Course Contents & Topics	This course will discuss and train students of the following techniques: 1. Noise and Data Analysis 2. Computer Grid 3. Raman spectroscopy and photoluminescence 4. Temporal characterization of ultrashort laser pulses 5. Chirped Pulse Amplification - Technique to amplify laser pulses 6. Cryogenics and low-noise electrical measurements 7. Nanofabrication techniques 8. Free-Electron Nanophotonics 9. Scanning Probe Microscopy 10. Electron and X-Ray Diffraction 11. Photoemission Spectroscopy 12. Transmission Electron Microscopy 13. Radiation Detection and Measurements in Nuclear Physics		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 describe and explain the working principles of the various techniques CLO 2 identify the strength and limitation of each technique, therefore, choose the right technique for characterization of properties CLO 3 know the operational details and interpret the data obtained by the techniques		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 2nd sem	Examination	No Exam

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. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. 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. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. 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. Apply moderately effective lab skills and techniques. Mostly correct by some erroneous use of data and results to draw appropriate conclusions. 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. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. 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. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.		
Course Type	Lecture with laboratory component elective course		
Course Teaching & Learning Activities	Activities	Details	No. of Hours
	Lectures		32
	Demonstrations of some selective techniques		8
	Reading/Self study		80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)
	Attendance		20
	Presentation		40
	In class quizzes		40
Quota	9999 (9999 if no quota)		
Required/recommended reading and online materials	Nil		

Course Code	PHYS8751 (RPG)		
Title	Device Physics		
Offering Department	Physics		
Course Co-ordinator	Prof M H Xie Physics		
Course Co-ordinator Email	mhxie@hku.hk		
Teachers Involved	Name	Department	Percentage
	Prof M H Xie	Physics	100
Course Objectives	The growth in the past 70 years of modern electronics industry has had great impact on society and everyday life, the foundation of which rests upon the semiconductor physics and devices. This course aims at presenting a comprehensive introductory account of the physics and operational principles of some selected and yet classic semiconductor devices, microelectronic and optoelectronic. The text is primarily designed for postgraduates but can be of interest to senior undergraduates in physics, electrical and electronic engineering and materials science. Students are assumed to have acquired some basic knowledge of quantum mechanics, statistical mechanics, and solid state physics, though a review of the physics of semiconductors will be given in the beginning of the course.		
Course Contents & Topics	This course begins by giving a review of solid state physics, particularly of the physics of semiconductors. It is then followed by discussions of the fundamentals and practical aspects of PN-junctions and rectifying diodes, amplifying and switching devices like bipolar and field-effect transistors (e.g., MOSFET), light-emitting and detection devices such as LEDs, laser diodes, and photodetectors. If time allows, a brief discussion of some special devices will be presented.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 understand basic working principles of selected devices CLO 2 understand the device performance merits and their characterization methods CLO 3 be acquainted with the processing technology and steps of device fabrications		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Y 2nd sem	Examination	May
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		

<table>
<tr><td></td><td colspan="3">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.</td></tr>
<tr><td>Course Type</td><td colspan="3">Lecture-based elective course</td></tr>
<tr><td rowspan="4">Course Teaching & Learning Activities</td><td>Activities</td><td>Details</td><td>No. of Hours</td></tr>
<tr><td>Lectures</td><td></td><td>36</td></tr>
<tr><td>Tutorials</td><td></td><td>12</td></tr>
<tr><td>Reading/Self study</td><td></td><td>80</td></tr>
<tr><td rowspan="4">Assessment Methods and Weighting</td><td>Methods</td><td>Details</td><td>Weighting in final course grade (%)</td></tr>
<tr><td>Assignments</td><td></td><td>20</td></tr>
<tr><td>Examination</td><td>2-hour written exam</td><td>50</td></tr>
<tr><td>Test</td><td></td><td>30</td></tr>
<tr><td>Quota</td><td colspan="3">9999 (9999 if no quota)</td></tr>
<tr><td>Required/recommended reading and online materials</td><td colspan="3">1. Solid State Electronic Devices (5th ed.), by B.G. Streetman and S. Benerjee
2. Semiconductor Physics and Devices, Basic Principles (3rd ed.), by D.A. Neamen
3. Physics of Semiconductor Devices (2nd ed.), by S.M. Sze</td></tr>
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