Course Code	PHYS8653		
Title	Selected topics in high energy astrophysics and cosmology		
Offering Department	Physics		
Course Co-ordinator	Dr L X Dai Physics		
Course Co-ordinator Email	lixindai@hku.hk		
Teachers Involved	Name	Department	Percentage
	Dr L X Dai	Physics	100
Course Objectives	The aim of the course is to offer an advanced introduction to cosmology as well as some current topics in high energy astrophysics. It may be taken as a self-contained course or as background to research work in astrophysics or cosmology.		
Course Contents & Topics	Topics include: 1) astrophysics: radiation mechanisms in high energy astrophysics, review and applications of general relativity, physics of astrophysical black hole systems; 2) cosmology: the big bang and expansion of the universe, the metric of the universe, galaxy structure and formation; cosmic microwave background; 3) recent hot topics in astrophysics and cosmology research.		
Course Learning Outcomes (CLO)	On successful completion of this course, students should be able to: CLO 1 apply physics principles to describe the physical properties of various astrophysical systems and observational aspects of cosmology CLO 2 explain the observed phenomena of cosmology and some selected astrophysical objects CLO 3 demonstrate knowledge and discuss the underlying physical concepts associated with some astrophysical systems and the cosmological evolution of the universe		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil		
Offer in 2025 - 2026	Yes 1st sem	Examination	Dec
Course Grade	A+ to F		
Grade Descriptors (Course level)	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		

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<tr><td></td><td>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>Lecture-based elective course</td></tr>
<tr><td>Course Teaching & Learning Activities</td><td><table>
<tr><th>Activities</th><th>Details</th><th>No. of Hours</th></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>
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<tr><td>Assessment Methods and Weighting</td><td><table>
<tr><th>Methods</th><th>Details</th><th>Weighting in final course grade (%)</th><th>Assessment Methods to CLO Mapping</th></tr>
<tr><td>Assignments</td><td></td><td>30</td><td>CLO 1,2,3</td></tr>
<tr><td>Examination</td><td>2-hour written exam</td><td>50</td><td>CLO 1,2,3</td></tr>
<tr><td>Test</td><td></td><td>20</td><td>CLO 1,2,3</td></tr>
</table></td></tr>
<tr><td>Quota</td><td>9999 (9999 if no quota)</td></tr>
<tr><td>Required/recommended reading and online materials</td><td>Lecture notes provided by Course Coordinator
B. W. Carroll & D. A. Ostlie: An Introduction to Modern Astrophysics (Addison-Wesley Publishing Company, 2007, 2nd edition)
G. B. Rybicki & A.P. Lightman: Radiative Processes in Astrophysics (Wiley-VCH, 1985)
M. Lachieze-Rey: Cosmology: A First Course (Cambridge University Press, Cambridge, 1995)
S. L. Shapiro and S. A. Teukolsky: Black Holes, White Dwarfs and Neutron Stars (John Wiley, 1983)</td></tr>
<tr><td>Course Website</td><td>http://moodle.hku.hk</td></tr>
<tr><td>Additional Course Information</td><td>NIL</td></tr>
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