

**The Chinese University of Hong Kong
Faculty of Science
Science Academy for Young Talent**

Summer Courses 2016
Course Outline

CUSA1055 A Brief History of the Universe
宇宙簡史

Introduction:

Cosmology is one of the most active research frontiers of current scientific investigation. With the tremendous progress in the past few decades, scientists have gradually formed a clear and dynamic picture of our Universe. In this course, we will go through the brief history of our Universe, including its content and the expanding history. We will also identify and learn a few important events that happened in the Universe, for example, the Big Bang Nucleosynthesis (BBN) and the Cosmological Microwave Background (CMB). Along with the theoretical development, we will also explore the fascinating experimental and observational discoveries that further confirmed or overturned our understanding towards the Universe.

From this course, students will have a most up-to-date introduction towards our Universe. They will have a taste of the most active research ideas undergoing in current academic society.

宇宙學是當前科學研究的熱點之一。伴隨著過去二三十年的急速發展，科學家們對我們的宇宙逐漸形成了一個清晰的動態圖景。在這門宇宙簡史課中，我們會介紹宇宙的構成部分以及它的膨脹歷史。同時，我們還會較為仔細地了解一些關鍵事件，例如大爆炸核合成（BBN）以及宇宙微波背景輻射（CMB）。另一方面，我們會探索一下與之相關的觀察與實驗。這些實驗可謂激動人心，有的支持或驗證了理論猜想，而有的卻全盤推翻了科學家們的預料。通過這門課，同學們會學會會有一個最與時並進的宇宙簡介，並且可以感受目前學術界最活躍的一些研究熱點。

Medium of Instruction: Cantonese supplemented with English

Organising Unit:

Office of General Education Foundation Programme, CUHK

Teacher:

Dr. Wu Jun, Vivian

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Demonstrator:

To be determined

Course Content:

15 August 2016 (Monday)	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• Introduction to cosmology• Content of the Universe• Discovery of Dark Matter• Discovery of Dark Energy• Calculating the age of the Universe• Expanding history of the Universe <p><u>Assessment:</u> In-class group exercise</p> <p><u>Discussion:</u> Q & A</p>
16 August 2016 (Tuesday)	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• The early Universe• Cosmological thermal history• Big Bang Nucleosynthesis (BBN) – a very brief introduction• Cosmological Microwave Background (CMB): From perspectives of observation, experiment and theoretical implications <p><u>Assessment:</u> Paper reading and discussion</p>
17 August 2016 (Wednesday)	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• Introduction to current research foci• Structure formation• Dark energy (optional)• Inflation (optional)• Gravitational waves (optional)• Conclusion <p><u>Discussion:</u> Q & A</p> <p><u>Assessment:</u> MCQ</p>
18 August 2016* (Thursday)	Make up class

Duration	2.5 whole day sessions (total 15 contact hours)
Date	15 – 17 August 2016 18 August 2016* (make up class)
Time	15 August 2016: 9:30 am – 12:30 pm; 2:00 pm – 5:00 pm 16 August 2016: 9:30 am – 12:30 pm; 2:00 pm – 5:00 pm 17 August 2016: 2:00 pm – 5:00 pm 18 August 2016*: 9:30 am – 12:30 pm; 2:00 pm – 5:00 pm (Make up class)
Venue	The Chinese University of Hong Kong
Enrollment	20 – 25
Expected applicants	S5 – S6 students
Tuition Fee	HKD 2,600.00
Credit	1 Academy Unit Certificates or letters of completion will be awarded to students upon completion.

* This date is reserved for make up classes in case there is any cancellation of classes due to bad weather or other factors.