

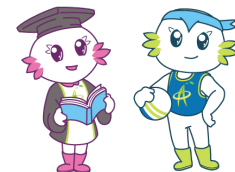


香港資優教育學苑

The Hong Kong Academy for Gifted Education

香港特別行政區政府教育局資助

Subvented by the Education Bureau, the Government of the HKSAR



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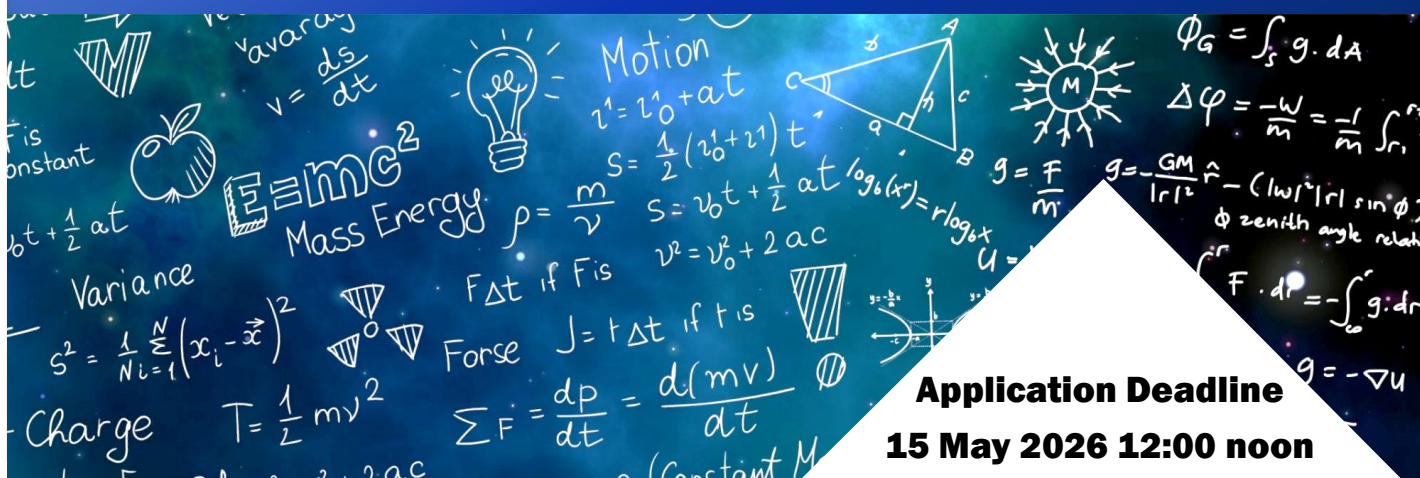
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[**Gifted Programme**]
Student-initiated event
(Level II)

Selected Topics in Theoretical Astrophysics

Mr. LEE Yiu Sing

Apprentice, The 5th Cohort of Hong Kong Gifted Apprentice Programme



Application Deadline
15 May 2026 12:00 noon

Result Release
22 May 2026

Intended Learning Outcomes

Upon completion of the gifted programme, gifted students should be able to:

1. have a basic understanding on Mathematics as an essential tool for the study of Physics;
2. have a quantitative understanding on the Astronomy;
3. strengthen their problem solving and higher-order thinking skills by understanding different aspects of Astronomy and Astrophysics;
4. broaden knowledge related to Astronomy and Astrophysics on the basis of secondary curriculum and common knowledge.

◆ Gifted Programme Introduction

Astrophysics investigates how celestial objects work, form and evolve. Astrophysicists utilize diverse disciplines to solve cosmic mysteries. This course is designed to engage secondary school students in the direct exploration of astrophysics, including but not limited to planetary dynamics, relativity, observational astrophysics, cosmology, and the application of quantum physics and thermodynamics. Through case studies, group discussions, laboratory sessions, hands-on sessions (to be held together with Astronomy Club in the HKU) and independent inquiry, they will deepen their understanding in astrophysics and analytical ability. They will learn how mathematics can be applied and appreciate how scientific theories are refined with new observational data. Through these activities, students will not only reinforce their physics and mathematics knowledge but also cultivate critical and creative thinking, broadening their perspective on the universe and science.

◆ Schedule

Session	Date	Content #	Time	Venue
1	18 Jul	Mathematical Physics & Classical Mechanics	2:00 p.m. – 4:00 p.m.	The Hong Kong Academy for Gifted Education, Room 206
2	20 Jul	Celestial Mechanics I		
3	22 Jul	Celestial Mechanics II		
4	24 Jul	Cosmology & Relativity I		
5	27 Jul	Practical Session & Our Solar System		
6	28 Jul	Theory about Instrumentation & Space Technologies		
7	29 Jul	Practical Session		
8	31 Jul	Cosmology & Relativity II		
9	3 Aug	Thermodynamics & Quantum Physics		
10	4 Aug	Frontiers of Astrophysics		
11	8 Aug	Test	2:00 p.m. – 4:30 p.m.	Room 205&206, HKAGE

More details of the contents can be found [here](#).

◆ Pre-requisite

Students should be able to:

- have knowledge of function, rectangular coordinates systems and basic trigonometry (sine, cosine and tangent),
- be curious to conduct independent inquiry, and
- be positive about mathematical symbols

◆ Suitable for

- F1 to F5 HKAGE student members in 2025/26 school year
- Class size: 20

◆ Medium of Instruction

Cantonese with English Handouts

◆ Screening

Please answer the screening question in the online application form.

*The screening question is designed to help the applicant understand the course level and the course content. The question must be answered by the student applicant and it can only be attempted once. The answer cannot be changed once the application is submitted. Selection is based on students' performance in answering the question. Only students who can demonstrate motivation and the knowledge of mathematics in the screening question can be enrolled in the programme

◆ Certificate

E-Certificate will be awarded to gifted students who have:

- attended at least 7 sessions from session 1 to 10;
- attended the last session (session 11) and
- completed all the assignments with satisfactory performance

◆ Sample Notes

Postulates in Special Relativity

The entire formal structure of Special Relativity is derived from two fundamental axioms:

Postulate

- (1) The laws of physics are invariant in all inertial frames of reference.
- (2) The speed of light in a vacuum is the same for all observers.

It results in

- (1) Time dilation: The faster an object moves through space, the slower it moves through time relative to a stationary observer.
- (2) Length contraction: The faster an object moves through space, the shorter it becomes in the direction of motion relative to a stationary observer.