








# Inequalities (MATS2230)

<p><b>Introduction</b></p>	<p>In mathematics, we may see problems involving inequalities everywhere. We use inequalities to find extreme values of functions, study properties of functions and prove mathematical theorems. In this course, we will discuss how to solve algebraic inequalities and inequalities involving absolute values. Then we study some important inequalities like AM-GM inequality and Cauchy-Schwarz inequality and their applications.</p> <p>The instructor, Dr Lau, is currently a lecturer in the Department of Mathematics of the Chinese University of Hong Kong. He has over 20 years of teaching experience in Secondary, Tertiary and Gifted Education.</p>
<p><b>Programme Type / Level</b></p>	<p>Algebra Course (Level 3) (<a href="#">Token-required</a>)</p>
<p><b>Instructor(s)</b></p>	<p>Dr Lau Chi Hin</p>
<p><b>Pre-requisites</b></p>	<p>Students should have the basic knowledge in:</p> <ol style="list-style-type: none"> <li>1. Solving linear inequalities</li> <li>2. Solving simultaneous equations</li> <li>3. Solving quadratic equations</li> <li>4. Basic coordinate geometry</li> </ol>
<p><b>Target Participants</b></p>	<p> <ul style="list-style-type: none"> <li>➤ S1 – S6 HKAGE student members</li> <li>➤ Class size: 30</li> </ul> </p>
<p><b>Medium of Instruction</b></p>	<p> English with English handouts</p>
<p><b>Certificate</b></p>	<p> <b>E-Certificate</b> will be awarded to participants who have:</p> <ul style="list-style-type: none"> <li>❖ Attended <b>at least 3 sessions AND</b></li> <li>❖ Attained <b>satisfactory performance</b> in all assessments</li> </ul>
<p><b>Intended Learning Outcomes</b></p>	<p> Upon completion of the programme, participants should be able to:</p> <ol style="list-style-type: none"> <li>1. Use algebraic and geometric methods in solving inequalities;</li> <li>2. Solve inequalities involving absolute value by case study;</li> <li>3. State and prove AM-GM inequality and Cauchy-Schwarz inequality;</li> <li>4. Apply AM-GM inequality and Cauchy-Schwarz inequality to solve mathematical problem.</li> </ol>
<p><b>Screening</b></p>	<p> Please answer the screening question in the online application form. *The screening question is designed to help the applicant understands 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 basic knowledge required in the screening question can be enrolled in the programme.</p>
<p><b>Application Deadline</b></p>	<p><b>18 May 2020</b> <b>12:00 n.n.</b></p> <p style="text-align: right;"><b>Application Result Release Date</b> <b>29 May 2020</b></p> <p>If student members withdraw from the programme after the Application Deadline, the token will be deducted.</p>

## Schedule



Session	Date	Time	Venue
1	13 Aug	2:00 p.m. – 5:00 p.m.	Online Teaching
2	15 Aug		
3	18 Aug		
4	20 Aug		

### Remarks:

For any assessment to be held in the programme, no make-up will be arranged, including the screening test.

### Sample Examples for the Programme

1. Suppose  $a > b$ . State the conditions for the following inequalities to hold:

(a)  $a^2 > b^2$

(b)  $\frac{1}{a} < \frac{1}{b}$

2. Solve the following inequalities

(a)  $\frac{2x-5}{x+4} \leq 1$

(b)  $x^2 - 5|x| + 4 > 0$

3. Let  $a, b, c$  be positive real numbers. Prove that

$$\sqrt[3]{abc} \leq \frac{a+b+c}{3}$$

### Enquiries



For enquiries, please contact us at 3940 0101 after language selection, press "1".