

# HKU Summer Institute 2022

## Undergraduate Programmes

Programme Details									
Programme Code	COUNTING2022								
Programme Title	Techniques of Counting								
Credit Bearing Programme	N/A								
Programme Description	Counting is one of the very first topics one encounters in mathematics. While the subject generally requires little prerequisite, it is so deep and broad that many elegant and surprising results arise. In this programme we will study various techniques of counting, and look at some famous numbers arising from counting problems.								
Programme Outline	<p>Topics will generally be selected from the following, and many counting problems in daily life settings will be studied.</p> <ol style="list-style-type: none"> <li>1. Various forms of combinations and permutations (e.g. with/without repetition, circular, different restrictions)</li> <li>2. Various formulas and techniques of counting (e.g. binomial theorem and its generalisations, inclusion-exclusion principle, generating functions, recurrence relations)</li> <li>3. Famous numbers arising from counting problems (e.g. derangement numbers, Fibonacci numbers, Catalan numbers, Stirling numbers, Bell numbers, Schröder numbers)</li> </ol>								
Learning Outcomes	<p>On successful completion of this programme, students should be able to:</p> <table border="1"> <thead> <tr> <th colspan="2">Programme Learning Outcomes (PLO)</th></tr> </thead> <tbody> <tr> <td>PLO 1</td><td>solve various combination and permutation problems using various formulas in combinatorics;</td></tr> <tr> <td>PLO 2</td><td>apply the techniques of recurrence relations and generating functions to counting problems;</td></tr> <tr> <td>PLO 3</td><td>describe the meanings and properties of some famous numbers arising from counting problems.</td></tr> </tbody> </table>	Programme Learning Outcomes (PLO)		PLO 1	solve various combination and permutation problems using various formulas in combinatorics;	PLO 2	apply the techniques of recurrence relations and generating functions to counting problems;	PLO 3	describe the meanings and properties of some famous numbers arising from counting problems.
Programme Learning Outcomes (PLO)									
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PLO 2	apply the techniques of recurrence relations and generating functions to counting problems;								
PLO 3	describe the meanings and properties of some famous numbers arising from counting problems.								
Study Load	<ul style="list-style-type: none"> <li>▪ 15-20 hours: study-at-own-pace (prerecorded video lectures, additional reading materials)</li> <li>▪ 15-20 hours: <b>online classes</b> (discussions, tutorials, assessments)</li> </ul> <p>(In addition to the above, students are expected to devote time to work on problems, do revisions and carry out further explorations. An additional 50 hours is expected.)</p>								

<b>Assessments</b>	<ul style="list-style-type: none"> <li>▪ 50% Final Examination</li> <li>▪ 50% Coursework (including participation, assignments, tutorials, quizzes/tests)</li> </ul> No supplementary examination will be offered.
<b>Language of Instruction</b>	English

Class Schedule	
<b>Programme Period</b>	June 27 - July 15, 2022
<b>Class Day &amp; Time</b>	Pre-recorded lecture videos – available from June 27 (Mon) <b>Online classes</b> – July 4, 6, 8, 11 (Mon/Wed/Fri) 14:00 - 17:00 <b>Online test</b> – July 8 (Fri) PM <b>Online examination</b> – July 15 (Fri) PM
<b>Venue</b>	This is a video-based course and students will watch lecture videos online and attend <b>online classes</b> .

Application	
<b>Target Students</b>	Non HKU Postgraduate Students, Non HKU Undergraduates
<b>Pre-requisite</b>	While no official prerequisite is needed, participants are expected to have some knowledge on the basics of combinations and permutations. They are expected to demonstrate mathematical maturity to some extent, and be extensively engaged in problem-solving and mathematical thinking during the program.
<b>Remarks</b>	Accommodation: Not Applicable
<b>Online Application</b>	Please visit the <a href="#">webpage of "Techniques of Counting"</a> for <a href="#">Online Application</a> .
<b>Programme Fee</b>	HK\$6,800
<b>Early Bird Offer*</b>	Apply on or before February 28, 2022 <ul style="list-style-type: none"> <li>▪ 5% discount on programme fee</li> </ul>
<b>Discount offered to HKUSI Alumni*</b>	<ul style="list-style-type: none"> <li>▪ 20% discount of the programme fee</li> </ul>
<b>Partnership Discount*</b>	<ul style="list-style-type: none"> <li>▪ 10% discount on programme fee (HKU Exchange Partners' students)</li> </ul>
<b>Discount offered to referral by HKUSI Alumni and HKU members*</b>	<ul style="list-style-type: none"> <li>▪ 10% discount of the programme fee</li> </ul>
<b>Deadline for Application</b>	June 10, 2022

\*All discounts are not in conjunction with any other discounts.

Enquiries
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