HKU Summer Institute 2022

High School Programmes

Programme Details		
Programme Code	HS-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	 Topics will generally be selected from the following, and many counting problems in daily life settings will be studied. 1. Various forms of combinations and permutations (e.g. with/without repetition, circular, different restrictions) 2. Various formulas and techniques of counting (e.g. binomial theorem and its generalisations, inclusion-exclusion principle, generating functions, recurrence relations) 3. Famous numbers arising from counting problems (e.g. derangement numbers, Fibonacci numbers, Catalan numbers, Stirling numbers, Bell numbers, Schröder numbers) 	
Learning Outcomes	On successful completion of this programme, students should be able to:Programme Learning Outcomes (PLO)PLO 1solve various combination and permutation problems using various formulas in combinatorics;PLO 2apply the techniques of recurrence relations and generating functions to counting problems;PLO 3describe the meanings and properties of some famous numbers arising from counting problems.	
Study Load	 15-20 hours: study-at-own-pace (prerecorded video lectures, additional reading materials) 15-20 hours: online classes (discussions, tutorials, assessments) (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.) 	

Assessments	 50% Final Examination 50% Coursework (including participation, assignments, tutorials, quizzes/tests) No supplementary examination will be offered.
Language of Instruction	English

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

Application		
Pre-requisite	S4 - S6, or Equivalent, in the academic year 2021-2022. While no official prerequisite is needed, participants are expected to have completed Secondary 4 (or equivalent) by the time of the program, with 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.	
Remarks	This programme is the same as the summer programme COUNTING2022 offered to non HKU undergraduate students. Accommodation: Not Applicable	
Online Application	Please visit the webpage of "Techniques of Counting" for Online Application.	
Programme Fee	HK\$6,800	
Early Bird Offer*	Apply on or before February 28, 2022 5% discount on programme fee	
Summer Scholarships offered by HKU Academy for the Talented*	Academy members 20% discount of the programme fee	
Discount offered to HKUSI Alumni*	 20% discount of the programme fee 	
Discount offered to referral by HKUSI Alumni and HKU members*	 10% discount of the programme fee 	
Deadline for Application	June 10, 2022	

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

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