HKU Summer Institute 2021

Undergraduate Programmes

Course Details	
Course Code	COUNTING2021
Course Title	Techniques of Counting
Credit Bearing Programme	N/A
Course 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 course we will study various techniques of counting, and look at some famous numbers arising from counting problems.
Course 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 course, students should be able to: Course Learning Outcomes (CLO) CLO 1: solve various combination and permutation problems using various formulas in combinatorics; CLO 2: apply the techniques of recurrence relations and generating functions to counting problems; CLO 3: describe 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 meeting (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	
Course Period	June 28 - July 16, 2021
Class Day & Time	Monday, Wednesday & Friday 14:00 - 17:00 (Note: There will be prerecorded video lectures which students can watch at their own pace, and live meetings will be scheduled in the afternoons (14:00 - 17:00) of July 5, 7, 9, 12 (Mon/Wed/Fri) with the final examination in the afternoon (14:00 - 17:00, possibly some time used to go through the questions after the exam) of July 16 (Fri).)
Venue	This course will be conducted via Zoom or other platforms (to be announced).

Application	
Target Students	Non HKU Postgraduate Students, Non HKU Undergraduates
Pre-requisite	While no official prerequisite is needed, participants are expected to demonstrate mathematical maturity to some extent, and be extensively engaged in problem-solving and mathematical thinking during the program. Knowledge on the basics of combinations and permutations would be an advantage.
Remarks	Accommodation: Not Applicable
Online Application	Please visit the **webpage of "Techniques of Counting"** for **Online Application**.
Course Fee	HK$6,600
Early Bird Offer	Apply on or before February 28, 2021 ▪ 5% discount on course fee
Partnership Discount*	10% discount on course fee (HKU Exchange Partners' students) * This discount is not in conjunction with other discounts
Deadline for Application	June 14, 2021

Enquiries

Tel: 2241 5199 / 2859 2250
Email: AMGS@maths.hku.hk
Url: http://www.math.hku.hk/
Department of Mathematics, The University of Hong Kong

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