

# HKU Summer Institute 2017

## High School Programmes

Course Details									
<b>Course Code</b>	MATH2012								
<b>Course Title</b>	Fundamental Concepts of Mathematics								
<b>Credit Bearing Programme</b>	6 credits Upon satisfactory completion of the course, students would be awarded 6 credits. These credits would be counted towards the students' studies in the Faculty of Science at HKU (by applying for an advanced standing of the course). Recognition by other HKU Faculties would be subject to the approval of individual Faculties.								
<b>Course Description</b>	This course is designed to introduce students to the fundamental concepts of mathematics such as sets, number systems, relations, functions and cardinality. It also serves as a bridge between computational and proof-based courses. By means of a wide variety of proof-writing and oral presentation practice, students will learn to communicate mathematics emphasizing precise logic and clear exposition. We hope that this course can invite students to explore mathematics more deeply and even entice some of them to become mathematics majors.								
<b>Course Outline</b>	<ol style="list-style-type: none"> <li><b>Sets and Logic:</b> Basic concepts in the language of sets, Subsets, Venn diagrams, Power sets, Set operations, Statements, Conjunctions, Disjunctions and Negations, Conditionals, Tautologies and Contradictions, Quantifiers, Quantified Statements</li> <li><b>Proof Strategies:</b> Direct Proof, Proof by Contrapositive, Proof by Cases, Proof by Contradiction, Proof by Mathematical Induction, Counterexamples, Prove or Disprove</li> <li><b>Equivalence Relations and Functions:</b> Relations, Reflexive, Symmetric and Transitive Relations, Equivalence Relations and Equivalence Classes, Partitions, Functions as Relations, Injective, Surjective and Bijective Functions, Compositions, Inverse Functions, Denumerable, Countable and Uncountable sets, Comparing Cardinalities of Sets</li> <li><b>Other Topics:</b> Introduction to Calculus: Sequences and Series; Introduction to Group Theory</li> </ol>								
<b>Learning Outcomes</b>	<p>On successful completion of this course, students should be able to:</p> <table border="1"> <thead> <tr> <th colspan="2">Course Learning Outcomes (CLO)</th> </tr> </thead> <tbody> <tr> <td>CLO 1</td> <td>understand the definition of a set and apply set theory in simple daily life problems</td> </tr> <tr> <td>CLO 2</td> <td>construct the truth table of a given statement</td> </tr> <tr> <td>CLO 3</td> <td>apply different proof strategies (e.g. proof by contradiction and mathematical induction) in proving a mathematical statement</td> </tr> </tbody> </table>	Course Learning Outcomes (CLO)		CLO 1	understand the definition of a set and apply set theory in simple daily life problems	CLO 2	construct the truth table of a given statement	CLO 3	apply different proof strategies (e.g. proof by contradiction and mathematical induction) in proving a mathematical statement
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	CLO 4 demonstrate the basic properties of equivalence relations
	CLO 5 understand the definition of the limit of a sequence of real numbers
	CLO 6 demonstrate the operational properties of groups
<b>Study Load</b>	36 contact hours + 120 learning hours
<b>Assessments</b>	<ol style="list-style-type: none"> <li>1. Final Exam: 50%</li> <li>2. Tests: 32%</li> <li>3. Assignments: 8%</li> <li>4. Tutorials: 10%</li> </ol> No supplementary examination will be offered.
<b>Language of Instruction</b>	English

Class Schedule	
<b>Date</b>	July 3 - July 21, 2017 (Tuesday, Thursday & Friday)
<b>Time</b>	09:30 - 12:30 and 14:30 - 17:30
<b>Venue</b>	The University of Hong Kong

Application	
<b>Target Students</b>	Secondary school students aged 16 or above <ul style="list-style-type: none"> <li>▪ Local</li> <li>▪ Non-local</li> </ul>
<b>Pre-requisite</b>	Pass the screening test. Remote screening test for non-local applicants would be held in March, 2017. The screening test for local applicants will be held on <b>June 10, 2017 (Saturday)</b> .
<b>Remark</b>	Students without Permanent HK Identity Cards may require visas to study in HKU. For student visa, please visit <a href="#">Here</a> .  HKU accommodation is also available, with priority given to students not residing in Hong Kong. For details, please visit <a href="#">Here</a> .
<b>Online Application</b>	Please visit the <a href="#">webpage of "MATH2012 Fundamental Concepts of Mathematics"</a> for <b>Online Application</b> .
<b>Programme Fee</b>	HK\$4,260 and HK\$350 Application Fee
<b>Deadline for Application</b>	<ul style="list-style-type: none"> <li>▪ March 15, 2017 for Non-local Applicants;</li> <li>▪ May 31, 2017 for Local Applicants</li> </ul>

Enquiries
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