HKU Summer Institute 2017

Undergraduate Programmes

<table>
<tr><th colspan="2">Course Details</th></tr>
<tr><td>Course Code</td><td>MATH2012</td></tr>
<tr><td>Course Title</td><td>Fundamental Concepts of Mathematics</td></tr>
<tr><td>Credit Bearing Programme</td><td>6 credits</td></tr>
<tr><td>Course Description</td><td>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.</td></tr>
<tr><td>Course Outline</td><td>1. Sets and Logic:
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
2. Proof Strategies:
Direct Proof, Proof by Contrapositive, Proof by Cases, Proof by Contradiction, Proof by Mathematical Induction, Counterexamples, Prove or Disprove
3. Equivalence Relations and Functions:
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
4. Other Topics:
Introduction to Calculus: Sequences and Series; Introduction to Group Theory</td></tr>
<tr><td>Learning Outcomes</td><td>On successful completion of this course, students should be able to:

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<tr><th colspan="2">Course Learning Outcomes (CLO)</th></tr>
<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>
<tr><td>CLO 4</td><td>demonstrate the basic properties of equivalence relations</td></tr>
<tr><td>CLO 5</td><td>understand the definition of the limit of a sequence of real numbers</td></tr>
<tr><td>CLO 6</td><td>demonstrate the operational properties of groups</td></tr>
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Study Load	36 contact hours + 120 learning hours
Assessments	1. Final Exam: 50% 2. Tests: 32% 3. Assignments: 8% 4. Tutorials: 10% No supplementary examination will be offered.
Language of Instruction	English

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

Application	
Target Students	Non HKU Undergraduates
Pre-requisite	High score in NCEE (Gaokao) math or in AP Calculus, or Good grade in IB Math (DP) or in GCE A-level Further/Pure math, or Equivalent.
Remark	Students without Permanent HK Identity Cards may require visas to study in HKU. For student visa, please visit **Here**. HKU accommodation is also available, with priority given to students not residing in Hong Kong. For details, please visit **Here**.
Online Application	Please visit the **webpage of "MATH2012 Fundamental Concepts of Mathematics"** for **Online Application**.
Programme Fee	HK$13,000 and HK$350 Application Fee
Additional Supporting Documents	Applicants should provide a list of current courses, plus past exam result sheets or transcripts.
Deadline for Application	▪ March 15, 2017 for Non-local Applicants; ▪ May 31, 2017 for Local Applicants

Enquiries

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