

City University of Hong Kong
Course Syllabus

offered by College/School/Department of Mathematics
with effect from Semester A 20 20 / 21

Part I Course Overview

Course Title:	Discrete Mathematics
Course Code:	MA2509
Course Duration:	One Semester
Credit Units:	3
Level:	B2
Proposed Area: <i>(for GE courses only)</i>	<input type="checkbox"/> Arts and Humanities <input type="checkbox"/> Study of Societies, Social and Business Organisations <input type="checkbox"/> Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	Nil
Exclusive Courses: <i>(Course Code and Title)</i>	MA2185 Discrete Mathematics MA2504 Discrete Mathematics

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course introduces the basic concepts and techniques of discrete mathematics. It will help students understand the basic theory and recognize the applications of discrete mathematics. It trains students in the ability to think quantitatively and analyze problems critically.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs [#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	explain at high levels concepts and implement basic operations in discrete mathematics.		✓	✓	
2.	perform combinatorial analysis to solve counting problems.			✓	
3.	design and formulate mathematical models through relations, combinatorics, graphs, and trees.		✓	✓	
4.	apply mathematical reasoning to comprehend and construct mathematical arguments.			✓	
5.	apply graph theory and other mathematical methods to both data structures and analysis of algorithms, and some other problems in computer sciences.			✓	✓
6.	the combination of CILOs 1-5		✓	✓	✓
		100%			

* If weighting is assigned to CILOs, they should add up to 100%.

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5	6	
Lectures	Learning through teaching is primarily based on lectures.	✓	✓	✓	✓	✓	✓	40 hours in total
Tutorials	Learning through tutorials is primarily based on interactive problem solving allowing instant	✓						4 hours
			✓					2 hours
				✓				2 hours
					✓			1 hour

	feedback.						✓		3 hours
Assignments	Learning through take-home assignments helps students understand basic concepts and techniques of discrete mathematics, and apply mathematical methods and analysis from discrete mathematics to some applications in computer sciences.	✓	✓	✓	✓	✓			after-class
Online applications	Learning through online examples for applications helps students create and formulate simple mathematical models and apply to some problems in computer sciences.			✓		✓			after-class
Math Help Centre	Learning activities in Math Help Centre provides students extra help.	✓	✓	✓	✓				after-class

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

30% Coursework

70% Examination (Duration: 3 hours, at the end of the semester)

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5	6		
Continuous Assessment: <u>30</u> %								
Quiz	✓	✓					5%	Questions are designed for the first part of the course to see how well the students have learned the basic concepts.
Test		✓	✓				15%	Questions are designed for the second part of the course to see how well the students have learned the basic techniques and

								recognize the applications of discrete mathematics.
Hand-in assignments	✓	✓	✓	✓	✓		5%	These are skills based assessment to enable students to demonstrate the basic concepts, techniques of discrete mathematics and identify the applications.
Formative take-home assignments	✓	✓	✓	✓	✓		5%	The assignments provide students chances to demonstrate their achievements on discrete mathematics learned in this course.
Examination: (duration: 3 hrs)							70%	Examination questions are designed to see how far students have achieved their intended learning outcomes. Questions will primarily be skills and understanding based to assess the student's versatility in discrete mathematics.
							100%	

* The weightings should add up to 100%.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Test	ABILITY to SOLVE in DETAIL and with ACCURACY the posed QUESTIONS	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Hand-in assignments	ABILITY to SOLVE in DETAIL and with ACCURACY the posed QUESTIONS	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Formative take-home assignments	ABILITY to SOLVE in DETAIL and with ACCURACY the posed QUESTIONS	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	ABILITY to SOLVE in DETAIL and with ACCURACY the posed QUESTIONS	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Propositional Logic. Predicate Logic. Sets. Functions. Relations. Equivalence & Order Relations. Combinatorics. Inclusion-Exclusion Principle. Recurrence Relations. Graphs. Directed Graphs. Connectivity. Euler & Hamilton Graphs. Weighted Graphs. Shortest Paths (Dijkstra's Algorithm), Trees. Rooted Trees. Binary Trees. Spanning Trees.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	K. H. Rosen, <i>Discrete Mathematics and Its Applications</i> , 7th Edition, McGraw Hill, 2012
2.	
3.	
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2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	
2.	
3.	
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