MA2144: DISCRETE MATHEMATICS

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Discrete Mathematics

Subject Code
MA - Mathematics
Course Number
2144

Academic Unit
Mathematics (MA)

College/School
College of Science (SI)

Course Duration
One Semester

Credit Units
4

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses

MA2504 Discrete Mathematics
MA2509 Discrete Mathematics
MA2185 Discrete Mathematics

Part II Course Details

Abstract

This course aims to introduce basic ideas of discrete mathematics such as formal mathematical reasoning techniques, basic counting techniques and their applications for computer science students. The objective is intended for students to understand the basic theory and some applications of discrete mathematics. The course gives students training in the ability to think quantitatively and analyse problems critically.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	explain at high levels concepts from discrete mathematics.		x		
2	implement basic operations in discrete mathematics.			x	
3	use formal mathematical reasoning techniques and basic counting techniques.			x	
4	develop mathematical models through relations,combinatorics, and functions, and apply mathematical methods to a range of problems in computer sciences.		x	x	
5	the combination of CILOs 1-4		x	x	

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 real-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.

Teaching and Learning Activities (TLAs)

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

4	Tutorials	Learning through tutorials is primarily based on interactive problem solving allowing instant feedback.	1	1 hour
5	Tutorials	Learning through tutorials is primarily based on interactive problem solving allowing instant feedback.	4	3 hours
6	Assignments	Learning through take-home assignments helps students understand basic mathematical concepts and techniques of discrete mathematics, and apply mathematical methods to some problems in computer sciences.	1, 2, 3, 4, 5	after-class
7	Online applications	Learning through online examples for applications helps students apply discrete mathematics to some problems in computer sciences.	4	after-class
8	Math Help Centre	Learning activities in Math Help Centre provides students extra help.	2, 3, 4	after-class

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Test	2, 3	15	Questions are designed for the first part of the course to see how well the students have learned the basic concepts, techniques and some applications of discrete mathematics.
2	Hand-in assignments	1, 2, 3, 4	15	These are skills based assessment to see whether the students are familiar with the basic concepts, techniques of discrete mathematics and some applications in computer sciences.

3	Formative take-home assignments	1, 2, 3, 4	0	The assignments provide students chances to demonstrate their achievements on discrete mathematics learned in this course.

Continuous Assessment (%)

30

Examination (%)

70

Examination Duration (Hours)

2

Additional Information for ATs

30% Coursework
70% Examination (Duration: 2 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 Rubrics (AR)

Assessment Task

1. Test

Criterion
ABILITY to SOLVE in DETAIL and withACCURACY the posed QUESTIONS

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task

2. Hand-in assignments

Criterion
ABILITY to SOLVE in DETAIL and withACCURACY the posed QUESTIONS

Excellent (A+, A, A-)
High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

3. Formative take-home assignments

Criterion

ABILITY to SOLVE in DETAIL and withACCURACY the posed QUESTIONS

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

4. Examination

Criterion

ABILITY to SOLVE in DETAIL and withACCURACY the posed QUESTIONS

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)
Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Mathematical logic. Methods of mathematical proof. Predicate calculus. Sets and relations. Cartesian product. Functions. Permutations and combinations. Inclusion-exclusion principle. Recurrence relations. Complexity analysis of algorithms.

Reading List

Compulsory Readings

	Title
1	https://www.cityu.edu.hk/ma/programmes/undergraduate/non-BSCM-students/topics-recommended-readings-servicing-courses#heading8

Additional Readings

	Title
1	Nil