

**City University of Hong Kong
Course Syllabus**

offered by College/School/Department of Mathematics
with effect from Semester B 2017 / 18

Part I Course Overview

Introduction to Abstract Algebra

Course Title: _____

Course Code: **MA3523**

Course Duration: **One semester**

Credit Units: **3**

Level: **B3**

Proposed Area:
(for GE courses only)

Arts and Humanities
 Study of Societies, Social and Business Organisations
 Science and Technology

Medium of Instruction: **English**

Medium of Assessment: **English**

Prerequisites: **MA2503_Linear Algebra**
(Course Code and Title)

Precursors: **Nil**
(Course Code and Title)

Equivalent Courses: **Nil**
(Course Code and Title)

Exclusive Courses: **Nil**
(Course Code and Title)

Part II Course Details

1. Abstract

(A 150-word description about the course)

The purpose of this course is to teach undergraduate student the fundamental concepts in abstract algebra, which are matrix operations, groups, vector spaces and linear transformations. The connection between matrix and group will be illustrated and practiced.

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.	Fluent in matrix operations.	10%	*	*	
2.	Explain the concept of group, subgroup and homomorphism between groups.	30%	*	*	*
3.	Explain vector spaces in abstract field.	15%	*	*	
4.	Solve linear transformations in terms of matrix operations.	15%	*	*	
5.	Explain deeper theories of group, for example, the Sylow Theorem, generators and relations, and apply to matrix operations.	30%	*	*	*
		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	
Lecture	Learning through teaching is primarily based on lectures	Y	Y	Y	Y	Y	39 hours in total
Take-home assignments	Learning through take-home assignments helps students understand basic concepts and theories of group, vector space	Y	Y	Y	Y	Y	after-class

	with abstract field, and linear transformations.							
...								

4. Assessment Tasks/Activities (ATs)

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

50% Continuous Assessment(s)

50% 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 Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4				
Continuous Assessment: <u>50</u> %								
Test	Y	Y	Y				10-50%	Questions are designed for the first part of the course to see how well students have learned the concepts and theories of matrix operations and group.
Formative take-home assignments	Y	Y	Y	Y	Y		0-10%	The assignments provide students chances to demonstrate their achievements on abstract algebra learned in this course.
Examination: <u>50</u> % (duration: 2 hrs, if applicable)								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 students' versatility in concepts and theories of matrix operations and group.
							100%	

* The weightings should add up to 100%.

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 APPLY and EXPLAIN the basic concepts and methodology of abstract algebra	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Examination	ABILITY to DERIVE mathematical proofs in abstract algebra	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Formative take-home assignments	CAPACITY for LEARNING to understand the principles of abstract algebra	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.)

Permutation matrix, group, subgroup, homomorphism, quotient group, abstract field, the characteristic polynomial, rotation, operations on subsets, the Sylow Theorem, generators and relations.

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.	"Algebra" by Michael Artin, Pearson (2rd edition), 2010.
2.	
3.	
...	

2.2 Additional Readings

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

1.	
2.	
3.	
...	