

ALGEBRA SERIES: LINEAR ALGEBRA

(MATS3250)

Introduction

A series of Algebra programmes offered by the **Department of Mathematics, the University of Hong Kong**, are designated for Maths lovers to learn Algebra progressively.

The **Algebra Series** consists of the following programmes:

Programme	Code	Application	Programme held
Matrices and Determinants	MATS3230	Jul-18	Oct 2018
Vectors	MATS3320	Oct-18	Dec 2018
Matrices and Equations	MATS3240	Jan-19	Mar 2019
Linear Algebra	MATS3250	Apr-19	Jun - Jul 2019

Here comes the last programme in the **Algebra Series**, Linear Algebra in which the level of difficulty reaches the undergraduate university level.

Linear algebra is central to almost all areas of mathematics. It is also widely regarded as a stepping stone into advanced mathematics. By studying linear equations and linear functions, the structure of vector spaces is constructed and the corresponding theories are established. The subject finds a wide variety of applications such as in physics, engineering, computer science, economics and finance.

Programme Type / Level

Algebra Course (Level 5) ([Token-required](#))

Instructor(s)

Dr Ching Tak Wing

Pre-requisites

Student should have basic knowledge in:

- Basic operations on vectors
- Basic operations on matrices
- Solving systems of linear equations

Target Participants



- S1 – S6 HKAGE student members
- Class size: 20

All applicants **MUST** attend the screening test held in **May 2019** in **HKU** except those who have passed **ALL** “Matrices and Determinants (MATS3230)”, “Vectors (MATS3320)” and “Matrices and Equations (MATS3240)”.

Priority will be given to student members who have passed **ALL** MATS3230, MATS3320 and MATS3240. They could have direct admission to this programme when apply.

Medium of Instruction



English with English handouts

Certificate



E-Certificate will be awarded to participants who have:

- ❖ Attending **AT LEAST 6** sessions AND
- ❖ Satisfactory performance in both assignments and assessments

Intended Learning Outcomes



- Upon completion of the programme, participants should be able to:
1. state and prove various properties of matrix and vector operations including addition, scalar multiplication, transposition and multiplication;
 2. state and prove equivalent conditions for invertible matrices, including those related to rank and determinant;
 3. identify linear transformations and find their standard matrices;
 4. determine whether a set is a vector space, and find its dimension when it is;
 5. find eigenvalues and eigenvectors of a matrix, and diagonalise the matrix when possible.

Application Deadline

**29 Apr 2019,
12:00 n.n.**

Application Result Release Date

17 May 2019

If student members withdraw from the programme after the Application Deadline, the token will be deducted.

Schedule (Tentative)



Session	Date	Time	Venue	Content
	11 May	10:00 a.m. – 12:00 n.n.	G05, James Hsioung Lee Science Building HKU	Screening Test
1	1 Jun	2:00 p.m. – 5:00 p.m.	Room 210 Run Run Shaw Building HKU	Review of Matrices, Vectors and Systems of Linear Equations
2	8 Jun			Concepts of Span and Linear Dependence
3	15 Jun			Linear Transformations
4	22 Jun			Mid-term Quiz and Discussions
5	29 Jun			Introduction to Vector Spaces
6	6 Jul			Eigenvalues and Eigenvectors
7	13 Jul			Further Applications of Linear Algebra
8	20 Jul			Test and Discussions

Remarks:

For any assessment to be held in the programme, no make-up will be arranged, including Screening Test.

[MAP](#)

Sample Examples for the Programme

1. Compute $\begin{pmatrix} 2 & 3 \\ 2 & 1 \end{pmatrix}^n$ where n is a positive integer.
2. Prove the Cayley-Hamilton theorem.

Enquiries



For enquiries, please contact us at 3940 0101 after language selection, press "1".