

2309 MATH100 Course Outline

Subject Code : MATH100
Subject Title : Linear Algebra
Course Type : Compulsory
Level : 2
Credits : 3
Teaching : Lecture 30 hours
Activity : Tutorial 15 hours
Prior : Advance mathematics
Knowledge*
Class Schedule

Class	Time		Classroom	Date
D1	Wed	09:00-11:50	C309	2023/09/04 - 2023/12/17
D2	Thu	09:00-11:50	C309	2023/09/04 - 2023/12/17

Instructor : Eric Cheung-choy TSANG
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Office : A218
Office Hour : Tuesday: 15:00-17:00
Wednesday: 14:30-17:30
Thursday: 14:30-17:30
Friday: 10:00-12:00

Course Description

This subject aims to train students understanding basic concepts and applications of linear algebra as an important tool for solving complex problems. Students are expected to have a good understanding and basic skills in problem description and problem solving with vectors, matrices, and linear systems.

PROGRAM LEVEL OUTCOME

Upon successful completion of the program students will have:

- (a) Apply fundamental knowledge of mathematics, algorithmic principles, computer theory, and principles of computing systems in the modelling and design of computer-based systems that demonstrate an understanding of trade offs involved in design choices.

- (b) Analyse a problem, specify the requirements appropriate to its computing solution, design, implement, and evaluate a computer-based system, process, component, or program that satisfies the requirements.
- (c) Apply design and development principles in the construction of software systems of varying complexity.
- (d) Use current skills, techniques, and tools necessary for computing practice.
- (e) Function effectively as a member of a team to accomplish a common goal.
- (f) Understand professional, ethical, legal, social, and security issues and responsibilities.
- (g) Analyse the local and global impact of computing on individuals, organizations, and society.
- (h) Write effectively.
- (i) Give effective oral presentations.
- (j) Recognize the need for, and an ability to engage in, continuing professional development.

INTENDED LEARNING OUTCOMES

Upon successful completion of this subject, students will be able to:

1. Understand the fundamental ideas of linear algebra.
2. Visualize the geometric interpretation of ideas in linear algebra courses.
3. Understand the importance of linear algebra and its applications in many branches of mathematics

Weekly Schedule

Index	Topic	Hours	Teaching Method
1	System of linear equations and matrices Matrices and linear systems, Augmented matrices, Row echelon matrices, Matrix equations, Linear independency, Rank of matrices, Applications	6	Lecture/tutorial
2	Determinants Laplace Expansion, Properties of determinants, Cramer's Rule	6	Lecture/tutorial
3	Euclidean Vector Spaces Real vector spaces, Bases and dimension, Subspaces	6	Lecture/tutorial
4	General Vector Spaces	6	Lecture/tutorial

	Orthogonal vector, Orthogonal bases, Orthogonal matrices, Orthogonal subspaces, Orthogonal transformations		
5	Eigenvalues and Eigenvectors Characteristic polynomials, Eigen-spaces, Diagonalizable matrix	6	Lecture/tutorial
6	Inner Product Spaces Norms, Real inner products, Angles, Euclid space and quadratic forms,	6	Lecture/tutorial
7	Linear Transformations Linear transformations, Matrices of linear transformations, Similarity	6	Lecture/tutorial
8	Review	1	Lecture/tutorial
9	Test	2	Mid-term Exam

TEACHING AND LEARNING APPROACH

The teaching and learning approach of this subject is to help students know why linear algebra as an important tool for solving complex problems are relevant and useful for engineering and the sciences. Application-oriented thinking is strongly suggested to promote study interest, help students develop right methodology for real problem-solving.

Lectures are conducted by means of explanation and chalk-talk through problem solving and plenty examples of applications from common life as well. Students are encouraged to respond to lecturer's questions through in-class discussion.

ASSESSMENT APPROACH

<u>Assessment method</u>	% weight
1.Attendance (Class participation)	10%
2.Assignments	25%
3.Midterm exam	15%
4.Final exam	50%
Total	100 %

Guideline for Letter Grade:

Marks	Grade
93-100	A+
88-92	A
83-87	A-
78-82	B+
72-77	B
68-71	B-
63-67	C+
58-62	C
53-57	C-
50-52	D
49	F

Notes:

Students will be assessed on the basis of continuous assessment (i.e. coursework in the form of individual assignments) and by an end of semester examination.

The coursework assessment items evaluate students' ability to apply concepts, to construct knowledge and skills in analysing.

Final examination will primarily cover all contents.

INDICATIVE READINGS**Required Text Book:**

Book title : Linear Algebra and its Applications

Author/Editor: David C. Lay, Steven R. Lay and Judi J. McDonald

Edition : global or 5th edition

Publisher : Pearson

Date : 2016

Reference Book:

Book title : Linear Algebra and Its Applications

Author/Editor : Gilbert Strang

Edition : LE

ISBN : 978-0030105678

Publisher : Thomson

Date : 4th edition