

Course Profile

Course Name:-	Linear Algebra
Course Code:-	MATH 107
Academic Year:-	1436-1437H
Semester:-	2

Course Overview

This course includes the following topics:

- 1) **Matrices and Gauss Elimination:** Elementary row operations, Transpose of a matrix, Inverse of a square matrix, Linear equation systems and Gauss eliminations.
- 2) **Determinants:** Determinants and their properties, classical adjoint matrix; Cramer's rule.
- 3) **Vector spaces:** Basic definitions, subspaces, linear dependence and independence, bases and dimensions, Rank of a Matrix.
- 4) **Linear transformations:** Basic definitions, the matrix of a transform, Kernel and Range of a linear transformation, Matrices of linear transformations, Coordinates and change of basis.
- 5) **Eigenvalues and Eigenvectors:** Characteristic polynomial, diagonalization of matrices, Applications involving Powers of matrices.

Course Details

Level:-	5
Credit:-	3 (3+0+1)
Pre-Requisites:-	NIL
Co- Requisites:-	NIL

Learning Outcomes of Course

Upon successful completion of the course, students should be able to:

- a) Solve systems of linear equations using Gauss Elimination, Cramer's rule and inverse matrix method.
- b) Understand the general concepts of vector spaces, subspaces, linear dependence and independence, bases and linear transformations.
- c) Calculate the eigenvalues and eigenvector of squared matrices.
- d) Solve important problems applying methods of linear algebra.

Course Assessment

Name of Assessment Task	Weight of Assessment	Week Due
1. Midterm Exam-1	20%	7 th
2. Midterm Exam-2	20%	11 th
3. Quizzes	10%	4 th , 9 th
4. Assignments/Report/Seminar	10%	5 th , 8 th , 11 th , 14 th
5. Final Exam	40%	16 th

Assessment Task and Learning Outcomes Alignment

Assessment Task Name	Course Learning Outcomes					
	1	2	3	4	5	6
1. Midterm Exam-1	√					
2. Midterm Exam-2		√	√			
3. Quizzes	√	√	√	√		
4. Assignments/Report/Seminar	√	√	√	√		
5. Final Exam	√	√	√	√		

Teaching Contact Details

Name of Course Coordinator:-	Dr. Sunil Kumar Sharma
Email of Course Coordinator:-	s.sharma@mu.edu.sa
Lab/Tutorial Instructor:-	N/A
Email of Lab/Tutorial Instructor:-	N/A
Office Hours:-	Wed 11 am-12 am, Tuesday 10.00 AM -11. AM
Office Number:-	024-1-18-1
Office Phone Number:-	00966-16404-5388

Details of Required Text Book

Book Name	Authors Name	Publisher	Year	Edition
1. Linear Algebra	Jones and Bartlett	Gareth Williams	2008	6 th
2. Linear Algebra, and Its Applications.	David C. Lay	Pearson		4th Edition
3. Linear Algebra, with Application	W. Keith Nicholson	McGraw-Hill	2009	6th Edition
4. Linear Algebra: A Modern Introduction.	D. Poole	Brooks Cole	2002	1st ed.

Details of Required Reference Books

Book Name	Authors Name	Publisher	Year	Edition
1. Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	2008	

IT Resources

The following IT Resources will require to access-

Course Schedule

Course Topics	Book's Chapter	Event Name	Week Due
Elementary row operations, Transpose of a matrix, Inverse of a square matrix,	R1 Chapter 1		Week-1
Linear equation systems and Gauss eliminations.	R1 Chapter 1		Week-2
Determinants and their properties	R1 Chapter 3		Week-3
Classical adjoint matrix; Cramer's rule.	R1 Chapter 3	Quiz 1	Week-4
Basic definitions, subspaces	R1 Chapter 4	Quiz-1	Week-5
linear dependence and independence	R1 Chapter 4	Assignment-1	Week-6
bases and dimensions	R1 Chapter 4	Midterm 1	Week-7
Rank of a Matrix	R1 Chapter 2	Assignment-2	Week-8
Basic definitions, the matrix of a transform, Kernel and Range of a linear transformation	R1 Chapter 2	Quiz-2	Week-9
Matrices of linear transformations	R1 Chapter 2		Week-10

Coordinates and change of basis.	R1 Chapter 2	Assignment-3	Week-11
Characteristic polynomial,	R1 Chapter 3	Midterm -2	Week-12
diagonalization of matrices	R1 Chapter 3	Assignment-4	Week-13
Applications involving Powers of matrices	R1 Chapter 3	Quiz-3	Week-14
Revision Classes			
		Final Examination	Exam Week

Referencing Style

The **American Psychological Association (APA)** referencing style must be use for all submissions of this course.

Course Assessment Task

Assessment Name:-	Midterm Exam-1
Description of Task Assessment:-	The closed book written examinations of 2 hour will be conducted. The questions will be asked in this paper are of remembering, understanding, application and analysis level question which will in turn increase the mathematical logical skill, linguistic and spatial skill.
Task Assessment Due Week/Date:-	7th
Return Week/Date to Students:-	8th
Weight of Task Assessment:-	20%
List of Learning Outcomes Assessed:-	<ul style="list-style-type: none"> a) Solve systems of linear equations using Gauss Elimination, Cramer's rule and inverse matrix method. b) Understand the general concepts of vector spaces, subspaces, linear dependence and independence, bases and linear transformations.

Assessment Name:-	Midterm Exam-2
Description of Task Assessment:-	This assignment is aligned to learning outcomes 1, 2 and 4. In that regard, the assignment contains questions that assess.
Task Assessment Due Week/Date:-	11th
Return Week/Date to Students:-	12th

Weight of Task Assessment:-	20%
List of Learning Outcomes Assessed:-	<ul style="list-style-type: none"> c) Solve systems of linear equations using Gauss Elimination, Cramer's rule and inverse matrix method. d) Understand the general concepts of vector spaces, subspaces, linear dependence and independence, bases and linear transformations. d) Solve important problems applying methods of linear algebra.

Assessment Name:-	Final Exam
Weight of Task Assessment:-	40%
Duration:-	3-hours
Warning:-	Nil
List of Learning Outcomes Assessed:-	<ul style="list-style-type: none"> a) Solve systems of linear equations using Gauss Elimination, Cramer's rule and inverse matrix method. b) Understand the general concepts of vector spaces, subspaces, linear dependence and independence, bases and linear transformations. c) Calculate the eigenvalues and eigenvector of squared matrices. d) Solve important problems applying methods of linear algebra.