



Course Specification

— (Bachelor)

Course Title: Linear Algebra

Course Code: MH222

Program: Information Technology /Computer Science

Department: Basic Sciences and Humanities

College: College of Computer and Information Sciences

Institution Majmaah University

Version: 2023

Last Revision Date: 11/09/2023



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A. General information about the course:

1. Course Identification

1. Credit hours: (3,1,0)

2. Course type

A. University College Department Track Others
 B. Required Elective

3. Level/year at which this course is offered: (Level 5)

4. Course general Description: Mathematics

5. Pre-requirements for this course (if any): MH223 Differential Equations

6. Pre-requirements for this course (if any):

7. Course Main Objective(s):

This course aims at giving student knowledge in fields:

- 1) **Introduce students to the subject of linear algebra which is essential for subsequent courses in mathematics and computer science.**
- 2) Let students be familiar with basics of matrices and determinants and their applications to solve systems of linear equations.
- 3) Let students be familiar with basics of vector spaces and linear transformations.
- 4) Let students be familiar with the notions of eigenvalues and eigenvectors with some of their applications.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		



No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	CLO1: Solve systems of linear equations using Gauss Elimination, Cramer's rule, and inverse matrix method.	K1	Classroom Teaching	Quiz, Assignments, Mid Exam, Final Exam
1.2	CLO2: Understand the general concepts of vector spaces, subspaces, linear dependence and independence, bases, and linear transformations.	K1	Classroom Teaching	Quiz, Assignments, Mid Exam, Final Exam
...				
2.0	Skills			
2.1	CLO3: Calculate the eigenvalues and eigenvectors of squared matrices.	S1	Classroom Teaching	Quiz, Assignments, Mid Exam, Final Exam
2.2	CLO4: Solve important problems applying methods of linear algebra.	S5	Classroom Teaching	Quiz, Assignments,



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				Mid Exam, Final Exam
2.3				
2.4				
3.0	Values, autonomy, and responsibility			
3.1				
3.2				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to matrices, Elementary row operations	4
2.	Inverse of a square matrix, Transpose of a matrix.	4
3.	Linear equation systems and Gauss eliminations	4
4.	Determinants: Determinants and their properties,	4
5.	classical adjoint matrix;	4
6.	Cramer's rule.	4
7.	Vector spaces: Basic definitions, subspaces,	4
8.	Linear dependence and independence,	4
9.	Basis and dimensions, Rank of a Matrix.	4
10.	Linear transformations: Basic definitions, The matrix of a transform,	4
11.	Kernel and Range of a linear transformation,	4
12.	Matrices of linear transformations, Coordinates and change of basis	4
13.	Eigenvalues and Eigenvectors: Characteristic polynomial,	4
14.	Diagonalization of matrices, Applications involving Powers of matrices.	4
15.	Revision	4
Total		60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	3,7,10, 12	15%
2.	Assignments	3,6,9,13	20%
3.	Mid Term Exam	8	20%
4.	Class Participation	All weeks	5%
5.	Final Exam	16	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Gareth Williams "Linear Algebra With Applications" Jones and Bartlett, 8th Edition, (2014). ISBN-13: 978-1284120097
Supportive References	David C. Lay "Linear Algebra, and Its Applications", Pearson, 5th Edition (2016) D. Poole, "Linear Algebra: A Modern Introduction", Brooks Cole; 3rd ed. (2011).
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom
Technology equipment (projector, smart board, software)	Smart Board, Projector
Other equipment (depending on the nature of the specialty)	Internet Connection

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer faculty members	direct
Effectiveness of	Students	indirect



Assessment Areas/Issues	Assessor	Assessment Methods
Students assessment		
Quality of learning resources	Faculty	direct
The extent to which CLOs have been achieved	Peer Reviewer	direct
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	

