



Faculty: Faculty of Science
Department: Mathematics Program: Bachelors

Course Plan

First: Course Information

Course Name	<i>Linear algebra-I-</i>		Course Number	0301241	
Credit Hours	3 hours	Theoretical	3 hours	Practical	0 hours
Prerequisite		Section Number: 6		Lecture Time:	
Level in JNQF	7				
Type Of Course	<input type="checkbox"/>	Obligatory Faculty Requirement		<input type="checkbox"/>	Elective University Requirement
	<input type="checkbox"/>	Obligatory University Requirement		<input type="checkbox"/>	Faculty Requirement
	<input type="checkbox"/>	Course Elective Specialty Requirement		<input checked="" type="checkbox"/>	Obligatory Specialization Requirement
Type of Learning	<input checked="" type="checkbox"/>	Face-to-Face Learning			
	<input type="checkbox"/>	Blended Learning (2 Face-to-Face + 1 Asynchronous)			
	<input type="checkbox"/>	Online Learning (2 Synchronous + 1 Asynchronous)			

Third: Course Description

System of linear equations, homogeneous and non homogeneous systems, Gauss elimination method and Gauss-Jordan method for solving systems of linear equations, matrices: operations on matrices, using elementary matrices to find the inverse of a matrix, determinants, Cramer's rule, vector spaces, subspaces, linear independence and span, basis, rank and nullity of a matrix, Gram-Schmidt method, changing basis, linear transformation, kernel and range, eigenvalues and eigenvectors, diagonalization.

Fourth: Course Objectives

- 1- Define and explain basic concepts in linear algebra, including vectors, matrices, and linear transformations.
- 2- Perform basic matrix operations and solve systems of linear equations using methods like Gaussian elimination and matrix inverses.
- 3- Define and identify vector spaces and subspaces.
- 4- Determine basis vectors for vector spaces.
- 5- Understand the concepts of linear independence and dependence among vectors.
- 6- Determine linear independence of given sets of vectors.
- 7- Define eigenvalues and eigenvectors.
- 8- Compute eigenvalues and eigenvectors for square matrices and understand their geometric significance.
- 9- Diagonalize square matrices when possible.

Fifth: Learning Source

Main Reference:	Elementary Linear Algebra	
Author: Anton	Issue No.: 11 th ed.	Publication Year: 20013
Additional Sources & Websites:	<ul style="list-style-type: none"> • Introduction Linear Algebra, by B. Kolman. • Elementary Linear Algebra, by S. I. Grossman. 	
Teaching Type:	<input checked="" type="checkbox"/> Classroom <input type="checkbox"/> Laboratory <input type="checkbox"/> Workshop <input type="checkbox"/> MS Teams <input checked="" type="checkbox"/> Moodle	

Sixth: Learning Outcomes

Level descriptor according to (JNQF)	CILOs Code	CILOs If any CILO will not be assessed in the course, mark NA.	Associated PILOs Code Choose one PILO for each CILO*	Assessment method** Choose at least two methods	Scores out of 100 State the total score identified for each CILO
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Knowledge	K1	Acquire foundational knowledge related to Linear Algebra. This involves understanding basic concepts, principles, and terminology associated with linear algebra.	P. K1	First exam Second Exam Final exam	26
	K2	Apply theoretical knowledge to solve basic problems in linear algebra	P. K3	First exam Second Exam Final exam	34
Skills	S1	Solve more complex problems in linear algebra using elementary techniques and methods	P. S3	First exam Second Exam Final exam	25
	S2	Analyze and optimize solutions obtained in certain topics of linear algebra and interpreting results.	P. S2	Final Exam	5
Competencies	C1	Self-learning topics in linear algebra	P. C1	Quizzes	5
	C2	Solving assignments in a group team and sharing ideas of linear algebra	P. C3	Assignments	5

*Refer to document (CC-2023-02) and page 2 in document (CC-2023-01)

** Refer to document (CC-2023-05)

**80% of the students must achieve the minimum acceptable percentage or higher for each CI

Seventh: Course Structure

	Intended Teaching Outcomes (ILOs)	Topics	Teaching Procedures*	Teaching Methods***	References****
	K1, K2	Introduction.	Face-to-Face	Lecture	Text book
	K1, K2	Introduction.	Face-to-Face	Lecture	Text book
	K 1, K2, S1	System of linear equations.	Face-to-Face	Lecture	Text book
	K 1, K2, S1	System of linear equations.	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Gaussian elimination	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Gaussian elimination	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Matrices and matrix operations.	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Rules of matrix arithmetic	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Elementary matrices and a method for finding the inverse...	Face-to-Face	Lecture	Text book
	K 1, K2, S1,	Further results on system of equations and invertibility.	Face-to-Face	Lecture	Text book
	K 1, K2, S1,	Further results on system of equations and inevitability	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Diagonal, triangular and symmetric matrices.	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Diagonal, triangular and symmetric matrices	Face-to-Face	Lecture	Text book
	K 1, K2, S1	Determinant function.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Evaluation determinant by row reduction.	Face-to-Face	Lecture	Text book
FIRST EXAM					

	K1, K2, S1,	Cofactor expansion & Cramer's rule	Face-to-Face	Lecture	Text book
	K1, K2, S1, C1	Exercise.	Face-to-Face	Lecture and Quiz	Text book
	K1, K2, S1,	Euclidean Vector Spaces	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Real vector spaces.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Real vector Subspace.	Face-to-Face	Lecture	Text book
	K1, K2, S1, C2	Exercise.	Face-to-Face	Lecture and Assignment	Text book
	K1, K2, S1,	Linear combination & span	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Linear independence.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Basis and dimension.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Basis and dimension.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Row space, column space and null space.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Row space, column space and null space.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Rank and nullity	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Eigenvalue and eigenvectors.	Face-to-Face	Lecture	Text book
SECOND EXAM					
	K1, K2, S1,	Diagonalization.	Face-to-Face	Lecture	Text book
	K1, K2, S1,	Diagonalization	Face-to-Face	Lecture	Text book
	K1, K2,	Linear	Face-to-Face	Lecture	Text book

	S1,	transformations			
	K1, K2, S1,	Inverse linear transformations.	Face-to-Face	Lecture	Text book
	Exercises				
	K1, K2, S1, S2	Kernel and range.	Face-to-Face	Lecture	Text book
	K1, K2, S1, S2	Kernel and range.	Face-to-Face	Lecture, Discussion	Text book
	K1, K2, S1, S2	Revision and Open Questions	Face-to-Face	Lecture, Discussion	Revision and Open Questions
	K1, K2, S1, S2	Revision and Open Questions	Face-to-Face	Lecture, Discussion	Revision and Open Questions
	K1, K2, S1, S2	Revision and Open Questions	Face-to-Face	Lecture, Discussion	Revision and Open Questions
	K1, K2, S1, S2	Revision and Open Questions	Face-to-Face	Lecture, Discussion	Revision and Open Questions
FINAL EXAM					

* Learning procedures: (Face-to-Face, synchronous, asynchronous). ** Teaching methods: (Lecture, video.....). *** Reference: (Pages of the book, recorded lecture, video....).

Eighth: Assessment methods

Methods	Fully Electronic Education	Integrated Teaching	Direct Teaching	Specific Course Output to be measured											
				*State the score identified for each CILO for each method of assessment out of 100											
				**If any CILO will not be assessed in the course, mark NA.											
				K1	K2	S1	S2	S3	S4	C1	C2	C3	C4	C5	
First Exam			20	8	7	5									
Second Exam			20	8	7	5									

Final Exam			50	10	20	15	5							
Assignment			5								5			
Quiz			5							5				
Total out of 100			100	26	34	25	5			5	5			

Ninth: Course Policies

- All course policies are applied to all teaching patterns (online, blended, and face-to-face Learning) as follows:
 - a. Punctuality.
 - b. Participation and interaction.
 - c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).