



Form: Course Syllabus	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	07

1.	Course Title	Linear Algebra I
2.	Course Number	0301241
3.	Credit Hours (Theory, Practical)	3
	Contact Hours (Theory, Practical)	3
4.	Prerequisites/ Corequisites	0301102
5.	Program Title	BSc. Mathematics
6.	Program Code	
7.	School/ Center	Science
8.	Department	Mathematics
9.	Course Level	College Requirement
10.	Year of Study and Semester (s)	Second year , 1 st and 2 nd or summer semester
11.	Other Department(s) Involved in Teaching the Course	None
12.	Main Learning Language	English
13.	Learning Types	☒ Face to face learning ☐ Blended ☐ Fully online
14.	Online Platforms(s)	☒ Moodle ☒ Microsoft Teams
15.	Issuing Date	13-10- 2024
16.	Revision Date	

17. Course Coordinator:

Name: Prof. Hasan Alnajjar	Contact hours: 11:30 – 12:30, (Su, Tue, Thu)
Office number: Math 310	Phone number: 22081
Email: h.najjar@ju.edu.jo	



18. Other Instructors:

Name: Prof. Fuad Kittaneh

Office number:

Phone number:

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Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19. Course Description:

As stated in the approved study plan.

Systems of linear equations; matrices and matrix operations; homogeneous and nonhomogeneous systems; Gaussian elimination; elementary matrices and a method for finding A^{-1} ; determinants; Euclidean vector spaces; linear transformations from R^n to R^m and their properties; general vector spaces; subspaces; basis; dimension; row space; column space; null space of a matrix; rank and nullity; inner product spaces; eigenvalues and diagonalization; linear transformations.

20. Program Student Outcomes (SO's):

(To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

- 1- Identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of Mathematics and Science and/or technical topics to areas relevant to the discipline.
- 5- Reflect the impact of technical and/or scientific solutions in economic, environmental, and societal contexts.
- 7- Utilize research methods, critical and creative thinking skills to assess and analyze information to solve problems properly, then draw valid reasoning and logical conclusions leading to true consequences

**21. Course Intended Learning Outcomes (CLO's):**

(Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Solve systems of linear equations using the Gauss-Jordan elimination method
2. Compute determinants, and prove the basic theorems about determinants and their properties
3. Employ matrices to solve systems of linear equations
4. Prove the basic theorems about systems of linear equations and matrices
5. Define the concepts of vector spaces, subspaces, linear combinations, and determine spanning sets, linear independence, bases, dimension
6. Define the concepts of inner product spaces, and determine norms, angles between vectors, orthogonality, and orthonormal bases
7. Compute the eigenvalues and eigenvectors of matrices, and prove the basic theorems about these concepts.
8. Use linear algebra concepts to solve real life applications

Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1		•	•			
2			•			•
3			•			
4		•	•			
5		•			•	
6	•	•	•			
7		•	•	•		
8			•			•



22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program SO's Course CLO's	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)	SO (8)
CLO (1)	•							
CLO (2)					•			
CLO (3)	•							
CLO (4)							•	
CLO (5)	•							
CLO (6)	•							
CLO (7)					•			
CLO (8)							•	

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types (Face to Face (FF)/ Blended/ Fully Online)	Platform Used	Synchronous (S) / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1	Introduction to Systems of Linear Equations	1	FF	Teams	S	Quiz	Textbook
	1.2	Gaussian Elimination	3	FF	Teams	S	Quiz	Textbook
	1.3	Gaussian Elimination	3	FF	Teams	S	Quiz	Textbook
2	2.1	Matrices and Matrix Operations	2	FF	Teams	S	Quiz	Textbook
	2.2	Matrices and Matrix Operations	7	FF	Teams	S	Quiz	Textbook
	2.3	Inverses; Rules of Matrix Arithmetic	3	FF	Teams	S	Quiz	Textbook
3	3.1	Inverses; Rules of Matrix Arithmetic	5	FF	Teams	S	Quiz	Textbook



	3.2	Elementary Matrices and a Method for Finding A^{-1}	1	FF	Teams	S	Quiz	Textbook
	3.3	Elementary Matrices and a Method for Finding A^{-1}	6	FF	Teams	S	Quiz	Textbook
4	4.1	Further Results on Systems of Equations and Inevitability	4	FF	Teams	S	Quiz	Textbook
	4.2	Diagonal, Triangular, and Symmetric Matrices	1	FF	Teams	S	Quiz	Textbook
	4.3	Diagonal, Triangular, and Symmetric Matrices.	7	FF	Teams	S	Quiz	Textbook
5	5.1	Determinants by Cofactor Expansion	1	FF	Teams	S		Textbook
	5.2	Evaluating Determinants by Row Reduction	5	FF	Teams	S	Midterm	Textbook
	5.3	Properties of the Determinant Function	6	FF	Teams	S	Midterm	Textbook
6	6.1	Properties of the Determinant Function	6	FF	Teams	S	Midterm	Textbook
	6.2	Finding Inverse Using Determinants	1	FF	Teams	S	Midterm	Textbook
	6.3	Cramer's rule	8	FF	Teams	S	Midterm	Textbook
7	7.1	Real Vector Spaces	1	FF	Teams	S	Midterm	Textbook
	7.2	Subspaces	2	FF	Teams	S	Midterm	Textbook
	7.3	Subspaces	2	FF	Teams	S	Midterm	Textbook
8	8.1	Linear Combination and Span	7	FF	Teams	S	Midterm	
	8.2	Linear Independence	7	FF	Teams	S		Textbook
	8.3	Basis and Dimension	7	FF	Teams	S		Textbook
9	9.1	Row Space, Column Space	1	FF	Teams	S		Textbook
	9.2	Nullspace	3	FF	Teams	S		Textbook
	9.3	Rank and Nullity	3	FF	Teams	S		Textbook
10	10.1	Eigenvalues	1	FF	Teams	S	Final exam	Textbook
	10.2	Eigenvectors	7	FF	Teams	S		Textbook
	10.3	Eigenvectors	7	FF	Teams	S		Textbook
11	11.1	Diagonalization	7	FF	Teams	S		Textbook
	11.2	Diagonalization	2	FF	Teams	S		Textbook
	11.3	Inner Products	1	FF	Teams	S		Textbook
12	12.1	Angle and Orthogonality in Inner Product Spaces .	3	FF	Teams	S		Textbook
	12.2	Orthonormal Bases; Gram-Schmidt Process	2	FF	Teams	S		Textbook



	12.3	Orthonormal Bases; Gram-Schmidt Process	7	FF	Teams	S		Textbook
13	13.1	General Linear Transformations	1	FF	Teams	S		Textbook
	13.2	Examples of Linear Transformations	1	FF	Teams	S		Textbook
	13.3	Examples of Linear Transformations	1	FF	Teams	S		Textbook
14	14.1	Kernel of a Linear Transformations	8	FF	Teams	S		Textbook
	14.2	Range of a Linear Transformations	8	FF	Teams	S		Textbook
	14.3	Matrices for Linear Transformations	2	FF	Teams	S		Textbook
15	15.1	Inverse Linear Transformations	7	FF	Teams	S		Textbook
	15.2	Inverse Linear Transformations	7	FF	Teams	S		Textbook
	15.3	Isomorphism	4	FF	Teams	S		Textbook

24. Evaluation Methods:

Opportunities to demonstrate achievement of the CLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Exam #1	20	Ch. 1	1+2+3+4+5+6+7	5	On Campus
Midterm	30	Ch.2 – Ch. 4	1+2+3+4+5+6+7+8	8	On Campus
Final Exam	50				On Campus

25. Course Requirements:

Each student must have:

- Account on Microsoft Teams

**26. Course Policies:**

1. Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
2. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
3. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
4. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
5. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on homework.

27. References:**A- Required book (s), assigned reading and audio-visuals:**

H. Anton and C. Rorres, Elementary Linear Algebra (11th edition), Wiley, 2015.

B- Recommended books, materials, and media:

1. B. Kolman and D. R. Hill, Elementary Linear Algebra (8th edition), Prentice Hall, 2004.
2. D. Lay, Linear Algebra and Its Applications (3rd edition), Addison-Wesley, 2003.
3. S. J. Leon, Linear Algebra with Applications (6th edition), Prentice Hall, 2002.

28. Additional information:

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Name of the Instructor or the Course Coordinator: Prof. Hasan Alnajjar	Signature:	Date: 13 – 10 – 2024
Name of the Head of Quality Assurance Committee/ Department: Prof. Manal Ghanem	Signature:	Date:
Name of the Head of Department: Prof. Baha Alzalg	Signature:	Date:
Name of the Head of Quality Assurance Committee/ School of Science: Prof. Emad A. Abuosba	Signature:	Date:
Name of the Dean or the Director: Prof. Mahmoud I. Jaghoub	Signature:	Date: