اعتماد
NCAAA

T4
2020

Course Specifications

Course Title:	Linear Algebra 1
Course Code:	MTH 241
Program:	B.Sc in Mathematics
Department:	Mathematics Department
College:	College of Science
Institution:	Majmaah University

Table of Contents

A. Course Identification

1. Credit hours:	

2. Course type

a. University ☐ College ☐ Department ✔ Others ☐

b. Required ✔ Elective ☐

3. Level/year at which this course is offered: Fourth Level/ Second year

4. Pre-requisites for this course (if any)**: Basis of Mathematics MTH 231**

5. Co-requisites for this course (if any)**: N/A**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	Blended		
3	E-learning	35	45%
4	Distance learning	35	45%
5	Other	5	10%

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	45
2	Laboratory/Studio	0
3	Tutorial	25
4	Others (specify)	5
	Total	75

B. Course Objectives and Learning Outcomes

1. Course Description

Recognize Matrices and their operations- Types of matrices- Elementary transformations-Determinants-elementary properties of determinants- Inverse of a matrix- Rank of matrix-Linear systems of equations.

Define Vector spaces- Linear independence - Finite dimensional spaces - Linear subspaces-Linear dependence and independence, basis and dimension (also, in subspaces), rank of a matrix, linear equations of vectors spaces, coordinates. Reproduce and State Methods Linear mappings- Kernel and image of a linear mapping-Describe Eigenvalues and eigenvectors of a matrix and of a linear operator mapping.

2. Course Main Objective

- To enable the students to understand the concepts of Linear Algebra.

2- The course aims at providing the student with the proper knowledge, cognitive skills, interpersonal skills, responsibility, communication skills, use of information technology skills and self – kinetics skills.

Specially, Study of main concepts of linear algebra as follows:

a. Studying matrices, determinants and operations on them.

b. Studying the vector spaces, subspaces and their properties.

c. Solving system of homogeneous and non-homogeneous linear equation.

d. Have the knowledge of the basis and dimension of the vector space.

e. Have the knowledge of Linear operators and How to give it in a matrix form.

f. Have the knowledge of Eigen values and eigenvectors of a matrix and their properties.

g. Studying of diagonalization and similar matrices.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Reproduce fundamentals and concepts of matrix theory and vectors spaces, linear operators, Eigen values and eigenvectors.	K1
1.2	Acquire linear algebraic knowledge and skills. -Solving system of homogeneous and non-homogeneous linear equation. - Studying of diagonalization and similar matrices.	K3
2	**Skills :**	
2.1	The students will explain and interpret a general knowledge of linear algebra such as: -Demonstrate the intersection of subspaces. -Demonstrate the Fundamental theorem of linear algebra.	S2
2.2		
2.3		
2...		
3	**Values:**	
3.1		
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Matrices and their operations- Types of matrices- Elementary transformations.	**15**
2	Determinants-elementary properties of determinants- Inverse of a matrix- Rank of matrix- Linear systems of equations.	**15**
3	Vector spaces- Linear independence - Finite dimensional spaces - Linear subspaces.	**15**
4	Linear dependence and independence, basis and dimension (also, in subspaces), rank of a matrix, linear equations of vectors spaces, coordinates.	**10**
5	Linear mappings- Kernel and image of a linear mapping.	**10**
6	Eigenvalues and eigenvectors of a matrix and of a linear operator mapping.	**10**
Total		

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	Identify Matrices and their operations- Types of matrices- Elementary transformations.	**Direct teaching**: Inquiry-based instruction Power Points and discussions **Aimed teaching**: Discovery and oral questions	• Homework • Quiz • Midterms • Final Exams • E-exam • Oral Exam
2.0	**Skills**		
2.1	The students will explain and interpret a general knowledge of linear algebra such as: -Demonstrate the intersection of subspaces. -Demonstrate the Fundamental theorem of linear algebra.	**Direct teaching**: Lectures Differentiation **Aimed teaching**: Discovery and oral questions **Indirect teaching**: Peer Learning	• Homework • Quiz • Midterms • Final Exams
3.0	**Values**		
3.1	Students can actively and critically participate in class activities; Students can act responsibly and ethically in conducting their work; Students can communicate, negotiate and evaluate their strengths and		Oral Discussions

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	weaknesses as team members.		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	7th week	20 %
2	Midterm 2	12th week	20%
3	Homework	Through of semester	5 %
4	Quizzes	Through of semester	5%
5	Electronic Test	14th week	5 %
6	Discussions	Through of semester	5%
5	Final exam	End of semester	40 %

Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- 4-office hours per week in the lecturer schedule.

-Sunday 8-10.

-Wednesday 8-10.

2- The contact with students by e-mail and website.

3- Activation of the virtual classrooms and academic guidance via Black Board LMS.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1) Elementary Linear Algebra with Applications, Francis G. Florey.
Essential References Materials	Elementary Linear Algebra 11th edition, Howard Anton, Amazon, 2011.
Electronic Materials	http://joshua.smcvt.edu/linearalgebra http://faculty.mu.edu.sa/azedan/Algebra http:// mathforum.org/advanced/numerical.html/ http://www.ingentaconnect.com/ content/ http://www.zentrablblatt-math.org/ zmath/en/

Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom with capacity of 30-students.
Technology Resources (AV, data show, Smart Board, software, etc.)	
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students/ internal committee	Direct (Students evaluation electronically organized by Deanship of registration and admission)/ Verification of students' papers
Extent of achievement of course learning outcomes	Staff members (Peer Reviewer)	Indirect (Frequent meetings consultation among the teaching staffs)
Quality of learning resources.	Staff members (course coordinators)	Direct (Meeting between course coordinators and the tutors)

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Mathematics Department
Reference No.	27
Date	8/8/1442 H-21/3/2021 G

Head of Department

Dr. Muqrin Almuqrin