اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Linear Algebra
Course Code:	2022204-3
Program:	Bachelor in Mathematics.
Department:	Department of Mathematics and Statistics
College:	Faculty of science
Institution:	Taif university

Table of Contents

A. Course Identification

1. Credit hours: (3 hours)	

2. Course type

a. University ☐ College ☐ Department √ Others ☐

b. Required √ Elective ☐

3. Level/year at which this course is offered: 6th level, 2nd year

4. Pre-requisites for this course (if any)**:**

(202112-3)

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

None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**4Hr /Week**	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	**40**
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify).	
	Total	**40**

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description
This course develops fundamental algebraic tools, such as Determinants and Matrices (proprieties and operations), Systems of linear equations, Homogeneous Systems of linear equations, Vector spaces, Subspaces, Linear independence of set of vectors, Bases and Dimension of a vector space, Row space, Column space, Null space, Linear transformations, Kernel and Range of a linear transformations, Associated Matrix of a linear transformation, Eigenvalues and Eigenvector, Diagonalization, including fundamental theorems and useful examples.

2. Course Main Objective

The student will be taught as follows:

1. Introducing the concepts and importance of linear algebra;
2. Describing the ability to solve problems using linear algebra and, implementing linear algebra to other fields both within and without mathematics.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Recognize fundamentals of Determinants and Matrices and how to use them professionally in linear algebra.	K1
1.2	Identify and solve mathematical properties on linear transformations and its types.	K1
2	**Skills:**	
2.1	Apply appropriate properties of the Determinants and Matrices to prove and solve some principles, theorems, formulas and problems on linear algebra.	S1
2.2	Explain the type of given linear transformation and finding its eigen values and its eigen vectors.	S1
2.3	Use computing knowledge, skills and mathematical packages in information analysis and suggestion of solutions.	S3
3	**Values:**	
3.1	Demonstrate act responsibility and ethically in conducting their work.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and Determinants	4
2	Matrices (proprieties and operations),	4
3	Methods of Solving System of linear equations,	4
4	Homogenous system of linear equations	4
5	Vector Spaces and Subspaces.	4
6	**Midterm exam,** Linear independence and dependence of vectors, Basis, Dimension,	4
7	Change coordinates in different basis,	4
8	Row space, Column Space and Null Space, Linear transformations, Kernel,	4
9	Range of a linear transformation, Associated Matrix of a linear transformation, Eigenvalues and Eigenvector	4

10	Diagonalization.	4
Total		40

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:**		
1.1	Recognize fundamentals of Determinants and Matrices and how to use them professionally in linear algebra.	• Interactive classes • Self-learning through the website • A rich variety of mathematical tasks and projects	• Quizzes • Assignments
1.2	Identify and solve mathematical properties on linear transformations and its types.	• Interactive classes • Self-learning through the website • A rich variety of mathematical tasks and projects	• Exams • Assignments
2.0	**Skills:**		
2.1	Apply appropriate properties of the Determinants and Matrices to prove and solve some principles, theorems, formulas and problems on linear algebra.	• Interactive classes • Group discussions	• Quizzes • Assignments
2.2	Explain the type of given linear transformation and finding its eigen values and its egien vectors.	• Lectures • Group discussions	• Exams • Quizzes
2.3	Use computing knowledge, skills and mathematical packages in information analysis and suggestion of solutions.	• Lectures • Self-learning through the website	• Exams • Quizzes • Assignments
3.0	**Values:**		
3.1	Demonstrate act responsibility and ethically in conducting their work	• Lectures	• Exams • Quizzes

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Quizzes + Home works**	**Continues**	**10 %**
2	**Midterm exam**	**5th-6th**	**30 %**
3	**Class Work (Homework- report- class test….)**	**8th**	**10 %**

Course Specifications

#	Assessment task*	Week Due	Percentage of Total Assessment Score
4	Final exam	11th	50 %

*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:

6 hours per week (as defined in the teaching schedule of the faculty member) for academic advice and consultations.
Teaching staff is also available using Blackboard web site and Taif University "Edugate" System.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	H. Anton and and C. Rorres, Elementary Linear Algebra, 11th Edition, Jon Wiley & Sons, New York., 2014. (Online).
Essential References Materials	Kwak and Hong, Linear Algebra, 2nd Edition, Springer, 2004.
Electronic Materials	Presentations sent to students via Blackboard.
Other Learning Materials	Lecturers from YouTube, prepared by Dr. Salah El Nafaey, (see the following link), https://www.youtube.com/watch?v=OzNfAQYstyE&list=PLp5QO1iuiUkNtvLwjssJYyQ3WbS9S8s2V

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	**Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students - Laboratories equipped with suitable numbers of computers**
Technology Resources (AV, data show, Smart Board, software, etc.)	**Laptop and projector**
Other Resources (Specify, e.g., if specific laboratory equipment is required, list requirements or attach a list)	**Wi-Fi internet connections**

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Peer Reviewer	Direct
	Students	Indirect
Extent of achieving the course learning outcomes	Peer Reviewer	Direct
	Students	Indirect

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	Department of Mathematics and Statistics
Reference No.	11
Date	12-7-1443 H

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