



Course Specifications

Course Title:	Linear Algebra
Course Code:	MATH 241
Program:	General course
Department:	Mathematics
College:	Science
Institution:	University of Tabuk

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A. Course Identification

1. Credit hours: 03 Hours/Week
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: L3/Y2
4. Pre-requisites for this course (if any): MATH200, MATH251
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	45	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

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

B. Course Objectives and Learning Outcomes

1. Course Description

The course is designed to study systems of linear equations, matrices, vector spaces, subspaces, bases and dimensions, inner product spaces, Eigen values, Eigenvectors Eigen spaces, and linear transformations.

2. Course Main Objective

The main objective of this course is to provide students with a comprehensive applied understanding of the common advantage of the technical method in the field of mathematics related to linear algebra.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Students will be able to recall the concepts of linear algebra.	K1
1.2	Students will be able to recognize the importance of linear algebra in different fields.	K2
2	Skills :	
2.1	Students will be able to solve systems of linear equations by different methods.	S3
2.2	Students will be able to prove theorems of linear algebra.	S2
2.3	Students will be able to apply basic knowledge of linear algebra in solving	S3

	mathematical problems.	
2.4		
3	Values:	
3.1	Students will be able to take responsibility for working independently.	V1

C. Course Content

No	List of Topics	Contact Hours
1,2,3	Systems of linear equations and Matrices - Gaussian elimination method - Gauss- Jordan elimination method - Homogeneous system of linear equation	9 Hrs
4,5	Operations on matrices, properties of matrix operations - Operation on matrices - Elementary matrices and method of finding the inverse of matrix - Further result on system of equations and inevitability.	6 Hrs
6	Mid-Exam 1	
7,8	Determinants - Evaluating determinant by row reduction - Properties of determinant function - Cofactor expansion - Cramer's rule	9 Hrs
9,10	Vector Spaces: Subspaces - Linear combinations - Linear dependence and linear independence - Basis and dimension - Row and column space of matrix - Inner product space - Length and angle in inner product spaces	9 Hrs
11	Mid-Exam 2	
12,13	Linear Transformations - Property of linear transformations - Kernel and range of linear transformation	6 Hrs
14	Eigenvalues and Eigenvectors - Introduction to eigenvalues, - Eigenvectors and Eigen spaces, - Diagonalization.	6 Hrs
15	Revision & Final Exam	
Total		45 Hrs

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	Students will be able to recall the concepts of linear algebra.	Introducing new ideas through case study Lectures Class Discussions	- Quizzes -Assignments -Midterm exams - Final exam
1.2	Students will be able to recognize the importance of linear algebra in different		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	fields.		
2.0	Skills		
2.1	Students will be able to solve systems of linear equations by different methods.	Lectures Class Discussions	- Quizzes -Assignments -Midterm exams - Final exam
2.2	Students will be able to prove theorems of linear algebra.		
2.3	Students will be able to apply basic knowledge of linear algebra in solving mathematical problems.		
3.0	Values		
3.1	Students will be able to take responsibility for working independently	- Lectures -Assign tasks	- Quizzes -Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home works and Assignments and Quizzes	Weekly basis	10%
2	First mid-term exam	6 th week	25%
3	Second mid-term exam	11 th week	25%
4	Final Exam	At end of the 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 :

* Six office hours per week in the lecturer schedule.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Jorg Liesen and Volker Mehrmann, Linear Algebra, First German Edition, Springer Undergraduate Mathematics Series, Springer International Publishing Switzerland, 2015.
Essential References Materials	Mac Gregor, P. "Applied linear algebra and matrix analysis (2nd edn.), Springer Verlag, 2018. R. Larson, and B. Edwards Elementary Linear Algebra, 5th Edition. D.H. Heath and Company, 2004.
Electronic Materials	None

Other Learning Materials	None
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2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> - Lecture Room with capacity of 30 students and equipped with White Board, Overhead projector and internet connection. - Library
Technology Resources (AV, data show, Smart Board, software, etc.)	Projectors
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Direct and Indirect
Extent of achievement of course learning outcomes	Teachers	Direct
Quality of learning resources	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	Program and study plan committee
Reference No.	
Date	25/08/2021