هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

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

Table of Contents

A. Course Identification

1. Credit hours: 03 Hours/Week
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
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 demonstrate knowledge of process and techniques of linear algebra in different fields.	**K2**
2	**Skills :**	
2.1	Students will be able to use analytical methods solve systems of linear equations by different methods.	S1
2.2	Students will be able to prove theorems of linear algebra.	S2

CLOs		Aligned PLOs
2.3	Students will be able to apply basic knowledge of linear algebra in solving mathematical problems.	S3
3	**Values:**	
3.1	Students will be able to take responsibility self-development and manage duties and time.	V2

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 demonstrate knowledge of process and techniques of linear		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	algebra in different fields.		
2.0	**Skills**		
2.1	Students will be able to use analytical methods 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 self-development and manage duties and time.	- Lectures -Assign tasks	- Quizzes -Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Activities	Weekly basis	5%
2	Homework	Weekly basis	5%
3	Quizzes	Weekly basis	10%
4	Mid Exam1	6th week	20%
5	Mid Exam2	11th week	20%
6	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	R. Larson, and B.Edwards Elementary Linear Algebra, 5th Edition. D.H. Heath and Company, 2004.
Essential References Materials	MacGregor, P. "Applied linear algebra and matrix analysis (2nd edn.) by Thomas S. Shores, pp. 479,£ 59.99 (hard), ISBN 978-3-319-74747-7, also available as e-book, Springer Verlag (2018)." The Mathematical Gazette 104.560 (2020): 376-376.
Electronic Materials	None
Other Learning Materials	None

2. Facilities Required

Item	Resources

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	- 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	The Curriculum committee
Reference No.	
Date	25/08/2021