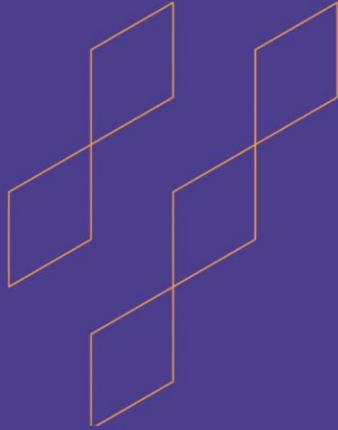




Course Specification

(Postgraduate Programs)

Course Title: Linear Algebra
Course Code: MATH 632
Program: Master of Science in Mathematics
Department: Mathematics
College: College of Science and Humanities
Institution: Prince Sattam Bin Abdulaziz University
Version: 2
Last Revision Date: 26\5\2025

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A. General information about the course:

1. Course Identification:

1. Credit hours: (3)

2. Course type

A. ☐ University ☐ College ☒ Department ☐ Track
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: (1)

4. Course General Description:

Linear functional and dual spaces, Canonical form of linear transformations, Jordan and rational forms, Multilinear forms, Hermitian, unitary and normal transformations, Tensor product of vector spaces.

5. Pre-requirements for this course (if any):

None

6. Pre-requirements for this course (if any):

None

7. Course Main Objective(s):

Become fully conversant with all basic concepts of Linear Algebra such as Linear Functionals, Linear Transformation, Vector Spaces and associated theorems and results and able to apply to solve mathematical problems

2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	48	100%
2	E-learning	0	0
3	Hybrid - Traditional classroom - E-learning	0	0
4	Distance learning	0	0



3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	48
2.	Laboratory/Studio	0
3.	Field	0
4.	Tutorial	0
5.	Others (specify).....	0
	Total	

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Gain knowledge through examples and counter examples of vector spaces, Linear maps and funtionals, sums of spaces, dual spaces and quotient space.	K1 and K2	1. Class Room Lectures 2. Interactive sessions 3. Office Hours.	1. Two Internal Exams 2. At least two Quiz
1.2	Recall and reproduce the properties and theorems of Free vector spaces, multilinear maps, tensor products and diagonalizations.	K1 and K2	4. Group discussion.	3. End Semester Exam
2.0	Skills			
2.1	Be able to prove theorems, solve problems and give counter examples of vector spaces, Linear maps and funtionals, sums of spaces, dual spaces and quotient space.	S1	1. Class Room Lectures 2. Interactive sessions 3. Office Hours.	1. Two Internal Exams 2. At least two Quiz
2.2	Be able to prove theorems, solve problems and give counter examples about Free vector spaces, multilinear maps, tensor products and diagonalizations.	S1	4. Group discussion.	3. End Semester Exam
3.0	Values, autonomy, and responsibility			
3.1				



C. Course Content:

No	List of Topics	Contact Hours
1.	Revision of the concepts of vector space on $\mathbb{R}$, linear transformations on $\mathbb{R}^n$, basis, inner product space.	3
2.	Vector Spaces and Subspaces	3
3.	Basis and Dimension.	6
4.	Linear Maps.	3
5.	Matrix Representation.	3
6.	Sums and Direct Sums.	3
7.	Quotient Spaces.	3
8.	Dual Spaces.	3
9.	Free Vector Spaces.	6
10.	Multilinear and bilinear Maps and .	3
11.	Tensor Products	6
12.	Diagonalization	3
13.	Jordan Canonical Forms	3

Total		

D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Midterm	6	15%
2.	Second Midterm	12	15%
3.	Quizzes	3, 9	10%
4.	Assignment and exercises	All weeks.	10%
5.	Final examination	At the end of the semester	50%
...			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





E. Learning Resources and Facilities:

1. References and Learning Resources:

Essential References	Sheldon Axler, Linear Algebra Done Right, 4 th edition, 2 January 2025
Supportive References	
Electronic Materials	Saudi Digital Library.
Other Learning Materials	

2. Educational and Research Facilities and Equipment Required:

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (Projector, smart board, software)	Projector, internet point.
Other equipment (Depending on the nature of the specialty)	

F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Graduates	Course Evaluation and Program Evaluation Survey (Indirect)
Effectiveness of students' assessment	Program Leaders	Peer review (Direct)
Quality of learning resources	Students	Indirect
The extent to which CLOs have been achieved	Students, Graduates	Indirect (Program Evaluation and Alumni Survey)
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval Data:

COUNCIL /COMMITTEE	DEPARTMENT COUNCIL MEETING 4
REFERENCE NO.	ITEM 4
DATE	OCT 2024

