

KING ABDULAZIZ UNIVERSITY Academic Assessment Unit

COURSE PORTFOLIO

FACULTY OF SCIENCE

DEPARTMENT OF MATHEMATICS

COURSE NAME: Linear Algebra

COURSE NUMBER: 241

SEMESTER/YEAR: 1st Term 1437/1438

DATE: 17/12/1437

PART II



COURSE SYLLABUS

Chapter I:Systems of linear Equations -Introduction to system of linear equations -Gaussian Elimination -Gauss – Jordan Elimination Chapter II:Matrices -Operation with Matrices -Properties of Matrix operations -The inverse of a Matrix Chapter III:Determinants -The Determinant of a Matrix -Evaluation of a Determinant using elementary operations -Properties of Determinants -Applications of Determinants ChapterIV:Vector Spaces -Vectors in Rn

-Vector Spaces
-Subspaces of Vector Spaces
-SpanningSets and Linear Independence
-Basis and Dimension
-Rank of a Matrix and Systems of Linear Equations Chapter VI:Linear Transformations
-Introduction to Linear Transformations
-The Kernel and Range of a Linear Transformation
-Matrices for Linear Transformations
ChapterVII:Eigenvalues and Eigenvectors
-Introduction to Eigenvalues and Eigenvectors

Instructor Information

- X Name of the instructor Dr. Siham Alsayyad
- Source Station Room 13 Building 7
- & Office hours

	Sat	Sun	Mon	Tue	We d
Time		9-10,12.5- 1	10-1	9- 10,12.5- 1	

- & Contact number(s) 63202
- E-mail address salsayyad@kau.edu.sa

Course Information

- Z Course name Linear Algebra
- 🖉 Course number 241
- *⊯* Course meeting times

	Sun	Mon	Tue	Wed	Thu
DAR	10-11		10-11		10-11
			1-2		

🖉 Places

K Course prerequisites and requirements

Course name	Course number
Calculus I	Math 101
Fundamentals of Mathematics	Math 251

Description of the Course

- Introduction to systems of linear equations, Gaussian elimination and Gauss-Jordan elimination for solving equations
- & Matrices, operations on matrices, properties of matrix operations, inverse of a matrix
- C Determinant of a matrix, elementary row operations, properties of determinants, Cramer's rule
- X Vector spaces, subspaces, linear combinations, linear independence, bases and dimensions
- X Rank of a matrix, the coordinates, change of bases
- Linear transformations, kernel, range, nullity of a linear transformation, linear transformations and matrices, symmetric matrices
- & Introduction to eigenvalues, eigenvectors and eigenspaces

Course Objectives

- Introduce the basic topics of linear algebra such as matrices, vector spaces, linear transformations, bases and dimension
- & Develop the students skills to solve linear equations in n variables
- & Study eigenvalues and eigenvectors

Learning Resources

- Elementary Linear Algebra (6th edition, 2004)
 By: Larson / Falvo
- Elementary Linear AlgebraBy: Howard Anton/ John Wiley

Course Requirements and Grading

& Student assessment:	1st Exam.	20marks
	2nd Exam.	20 marks
	Home work on	line 10 marks
	Section	10 marks
	Final Exam.	40 marks

K Expectations from students:

- De punctual
- \clubsuit Commit to a decent appearance
- C Turn off mobile phone during the lecture

& Student responsibilities to the course

- \clubsuit Study the book
- \clubsuit Attend all exams
- \heartsuit Be alert during lectures
- Participate in the course exercises

A Important rules of academic conduct

- Missed exams with acceptable excuses will be counted as a percentage of all exams
- A student that exceeds a 25% of being absent with no acceptable excuse is deprived from entering the final exam.

Learning Resources

Elementary Linear Algebra (6th edition, 2004) By: Larson / Falvo

Detailed Course Schedule

Week #	Торіс	Exercises
1&2	Chapter1: Systems of linear equations 1.1 Introduction to Systems of Linear Equations Examples (1-5)	Exercises 1-6,16,65,69,70
	1.2 Gaussian Elimination and Gauss-Jordan Elimination Examples (1-9)	Exercises 4,7,20,21,27,44,47,48,49,57,61,62
	Chapter2: Matrices 2.1 Operations with Matrices Examples (1-6)	Exercises 1-3,7-10,12-15,21- 28,37,38,40,41,44,49,51-53
3&4	2.2 Properties of Matrix Operations Examples (1-10)	Exercises 1,5,7,13,14,16,17,19- 22,29,30,32,39,55,57-59,61,65
	2.3 The Inverse of a Matrix Examples (1,3-8) Exc.48	Exercises 2,4,5,9,25- 27,33,38,39,41,42,49,52,56-58
	Chapter3: Determinants 3.1 The Determinant of a matrix Examples (1-4,6)	<i>Exercises</i> 13,15,19,33,41-45,49,51-54,67- 72,74

Week #	Торіс	Exercises
5&6	3.2 Evaluation of a Determinant Using Elementary Operations Examples (2-6)	Exercises 15-20,31-33,48
	3.3 Properties of Determinants Examples (1-6)	Exercises 3,4,7- 9,12,15,23,25,45,47,49,50,64,65,69, 72,73
	3.5 Applications of determinants Examples (1-4)	<i>Exercises</i> 2-4,11,15,25-27,29,43
	Chapter4: Vector Spaces	
	4.1 Vectors in \mathbb{R}^n	Exercises 13,15,23,27,28,47-49
	Examples (4-6)	
7&8	<i>4.2 Vector Spaces</i> Examples (2-4,6-8)	<i>Exercises</i> 1,3,4,6,19-24,29(a,b),33,34
	<i>4.3 Subspaces of Vector Spaces</i> Examples (1-4+6-8)	<i>Exercises</i> 1,4,7,9,29,31-35,41,44,45
9&10	<i>4.4 Spanning Sets and Linear Independence</i> Examples (1-13)	Exercises 2,7,9,13,15,18,19,21,27,31,32,39,49, 59,65
	4.5 Basis and Dimension Examples (1-12)	<i>Exercises</i> 8,9,11,16,17,21,25,35,41,43,45,49,6 3,67,70,73,79
	4.6 Rank of a Matrix and Systems of Linear equations Examples (2-9)	<i>Exercises</i> 2,3,7,9,13,15,21,23,27,29,35,66

ACADEMIC ASSESSMENT UNIT					
Week #	Торіс	Exercises			
11&12 &13	Chapter6: Linear transformations 6.1 Introduction to Linear transformations Examples (1-2,4-6,9-10)	Exercises 2,3,9,10,15,17,20,22,23,32,33,39,53, 68,69,73			
	6.2 The Kernel and Range of a Linear transformation Examples (1-2,4-9)	<i>Exercises</i> 1,3,5,9,11,13,17,22,31,33,49,51,56			
	6.3 Matrices for Linear transformations Examples (1-2,4)	Exercises 2,4,5,11,13,15,48-50,54,55			
14&15	Chapter7: Eigenvalues and Eigenvectors 7.1 Eigenvalues and Eigenvectors Examples (1-2,4-5,7-8)	Exercises 2,7,11(a,b),13(a,b),15,17,19,23,25,6 3,65			

Practical Sessions Schedule Model

Lab. #	Date	Exp/Practical title	Reading Assignment	What is Due?
1	Sep 1	Safety & Regulations		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

PART III



COURSE RELATED MATERIAL

Contains all the materials considered essential to teaching the course, includes:

Quizzes, lab quizzes, mid-terms, and final exams and their solution set Paper or transparency copies of lecture notes/ handouts (optional) Practical Session Manual (if one exists) Handouts for project/term paper assignments

PART IV



EXAMPLES OF STUDENT LEARNING

Examples of student work. (Included good, average, and poor examples)

Graded work, *i.e.* exams, homework, quizzes Students' lab books or other workbooks Students' papers, essays, and other creative work Final grade roster and grade distribution Examples of instructor's written feedback of student's work, (optional) Scores on standardized or other tests, before and after instruction, (optional) Course evaluation, self evaluation or students comments (optional)



Part V. Instructor Reflections on the Course

- & Instructor feedback and reflections
- Z Propose future improvement and enhancement
- Z Conceptual map of relationships among the content, objective, and assessment
- K Recent trends and new approaches to teach the course.

