

KING ABDULAZIZ UNIVERSITY Academic Assessment Unit

COURSE PORTFOLIO

FACULTY OF SCIENCE

MATHEMATICS DEPARTMENT

COURSE NAME:	Topics In Algebra		
COURSE NUMBER:	445		
SEMESTER/YEAR:	First term	2016/2017	
DATE:	18/9/2016		

PART II



COURSE SYLLABUS

- : chapter I: Vector spaces
 - Revision.
 - Coordinates representation general n-dim . spaces
 - Applications of vector spaces.
 - Linear differential equations.
 - Solution of linear homo. Differential equations.
 - Wronskian.
- Chapter II: Inner product space.
 - length, distance and angle.
 - Caushy Schwarz inequality.
 - General inner products.
 - -Length, distance and angle in inner product space.
 - -Caushy Schwarz inequality in Inner product space.
 - -Triangle inequality and Pythagorean theorem in Inner product space.
 - Orthogonal projection in Inner product space.
 - The orthogonal complement.
 - Projection theorem.
 - Orthonormal bases (gram Schmidt process).
 - Alternative method of gram Schmidt process.
 - QR Decomposition.
 - Applications of inner product spaces.
 - Cross product of two vectors.

Chapter III: Linear transformation.

- General linear transformations (Definitions, terminology and Examples).
- -Matrices of general linear transformations.
- Examples.
- Matrices of identity operators.
- Transition matrices, similarity.

Chapter IV: Eigen values and Eigen vectors.

- Introduction of eigenvalues and eigenvectors.
- Eigenvalus of triangular matrices.
- -Eigenvalues and eigenvectors of the powers of matrix.
- Cayley Hamilton theorem.
- Digitalization with theorems and examples.
- Applications of eigenvalues and eigenvectors:
 - solution of systems of linear differntial equations problems involving quadratic forms.
 - Diagonalizing quadratic forms.
 - Conic section.
 - Quadric surfaces.

Chapter V : Complex vector spaces.

- Complex numbers.
- Operations on complex unmbers.
- Modulus, complex conjugate and division.
- Polar form, demoivres theorem.
- Complex exponents.
- Complex vector spaces.
- Norm and distance in C_n .
- Complex Euclidian inner products.
- Complex inner product spaces.
- Unitary, normal and Hermitian matrices.

ACADEMIC ASSESSMENT UNIT **Instructor Information** Name of the instructor: Siham Alsayyad Office location: Room:13 c **Building:** 7 **Office hours:** Sun Mon Tue Wed Tur Time 9-10, 10-1 9-10,12.5-12.5-1 Contact number(s): 63202 sihamalsayyad@yahoo.com E-mail address(s): **Instructor's profile** (*optional*): salsayyad@kau.edu.sa A welcome letter to the student (optional): **Course Information Course name:** Topics in algebra **Course number:** 445 **Course meeting times:** Wed Sun Mon Tue Tur Time 11-11-12.5 12.5 Place: Room:72/C Building:7 **Course website address: Course prerequisites and requirements:** Course name Course number Linear algebra 1 241 **Description of the course:** * Review:vector spaces.Inner product space.Caushy (what, why, philosophy, teaching methodology) Schwarz inequality.Gram Schmidt process.Eigen values and vectors, characteristic

Course Objectives

The student will be able to understand more of pure mathematics conceptions. Develop solving theoretical problem skills, method of proofs. Developing student ability to connect theory and applications.

hermetian matrices

polynomials.Diagonalization,symmetric

matrices. Application to differential equations and quadratic forms. Complex vector spaces, unitary and

Students will be familiar of proofs of theorems and its applications. The student will be trained how to solve problems by applying what she had learned in theorems. Encourge and train the student to read, understand proofs, use it in order to do new proofs. The student will have a good background to study higher courses in algebra.

O (A statement of what the student will know and be able to do as the result of learning)

O (A statement on how they will be expected to demonstrate their learning)

Learning Resources

ACADEMIC ASSESSMENT UNIT			
Textbook:	Title : Elementary linear algebra Author: Howard Anton 8 th Edition		
Reading material:	Title : Elementary linear algebra		
	Author : Larson Edwards 4thEdition		
Lab guide:	Title: Author: Publisher: Found in:		
E-resources:			
The computer usage: (if it applies) Software needed: Lab location: Lab hours: Safety precautions: Instructions for use:			

Course Requirements and Grading

Student assessment: (A clear rationale and policy on grading)	Test one 25% Test two 25%,10% Quizes,Final 40% total 100%.The letters grading systems (A B C D F +) will be used in this course . A = Excellent work .B= Good work. C = Acceptable work. D= Marginally acceptable work. F= Unacceptable work.
Expectations from students:	The student must be quite during lectures .The
(Attitudes, involvement, behaviors, skills, and ethics)	student must respect the teacher as well as other students in the same class .The student must be cooperative and helpful with others.The student must close the cell phone during lectures.
Student responsibilities to the course:	We all must be actively involved in the class .First ,we must attend .Second we must share our thoughts . Students must do all home work .Students must attend all tests and quizzes. If a student couldnot attend an exam because of illness she will have a percent of the final exam.
Expectations for each assignment and project:	*
Important rules of academic conduct:	
Lab plan and assignments: (<i>if it applies</i>)	

6. Detailed Course Schedule

(Included templates of tables for course schedule and practical sessions)

Course Schedule Model (meeting two times a week)

Week #	Date	Торіс	Reading Assignment	What is Due?
		Introduction to the course		Buy Book
1		Coordinates and change of basis	Chapter 1	
2		Application of vector spaces. Solution of linear		Homework assignment #1
		Inner product space		Home work 2
3		Caushy Schwarz inequality		
4		General inner products		Home work 3,4
		Orthogonal projection		
-		Orthogonal complement		
5		Gram schmeidt process		Home work 5,6
6		QR Decomposition		
0		First Exam		
		Linear Transformation		Home work 7
7		General Linear Trasformation		
8		Matrices of General Linear Trasformation		Home work 8
		Similarity		
9		Examples		
,		Eigen values and Eigen vectors		
10		Cayley Hamilton Theorem		Home work 9,10
10		Diagonalization		
		Applications		
11		Solution of system of linear differential equations		
12		Quadratic forms		

Week #	Date	Торіс	Reading Assignment	What is Due?
		Second Exam		Home work 11
12		Complex vector spaces		
15		Complex numbers		
		Demoivers theorem		
14		Complex eucledean inner product		Home work 12
15		Hermitian matrices		
				Home work 13
		Final Exam all sections		

Course Schedule Model (meeting three times a week)

Week #	Date	Торіс	Reading Assignment	What is Due?
	Sep 10			Buy Book
1	Sep 12		Chapter 1	
	Sep 14			
	Sep 17		Chapter 1	Homework assignment #1
2	Sep 19			
	Sep 21			
	Sep 24		Chapter 2	Home work 2
3	Sep26		Chapter 2	
	Sep 28			
	Oct 1		Chapter 2	Home work 3
4	Oct 3		Chapter 2	
	Oct 5			
	Oct 8		Chapter 3	
5	Oct 10		Chapter3	Home work 4
	Oct 12			
6	Oct 15		Chapter 3	

Week #	Date	Торіс	Reading Assignment	What is Due?
	Oct 17			
	Oct 19		Chapters1,2	
	Oct 22	Test (1)	Chapter1	
7	Oct 24			
	Oct 26			
	Nov 12		Chapter3	
8	Nov 14			
	Nov 16			
	Nov 19			
9	Nov21			
	Nov 23			
	Nov 26			
10	Nov 28			
	Nov 30			
	Dec 3			
11	Dec 5			
	Dec 7			
	Dec 10			
12	Dec 12			
12	Dec 14			
	Dec 17			
	Dec 19			
13	Dec 13			
	Dec 24			
	Dec 24			
14	Dec 28			
	Dec 31			
15				
	Jan 2			n

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Practical Sessions Schedule Model

Lab. #	Date	Exp/Practical title	Reading Assignment	What is Due?
1	Dec.4	Sientefic work place		
2	Dec.11	Sientefic work place		
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

(use the following template for Quizzes, lab quizzes, mid-terms, and final exams and their solution set)

King Abdul Aziz University Faculty of Science Mathematics Department		Hare and Starle	Math 101 - Exam 1 2 nd Semester 2005/2006 Date: (<i>the exam date</i>) Time allowed: (<i>time allow</i>	5 ved)
Q1	(Insert question one here)			8 marks
Q2	(Insert question two here)			8 marks
Q3	(Insert question three here)			8 marks
Q4	(Insert question four here)			8 marks
Q5	(Insert question five here)			8 marks
			Total	25

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
- \swarrow Evaluate student competency and reflect on their course evaluation for improvements to the course
- Z Conceptual map of relationships among the content, objective, and assessment
- K Recent trends and new approaches to teach the course.



COURSE PORTFOLIO CHECKLIST

- □ TITLE PAGE
- **COURSE SYLLABUS**
- **COURSE RELATED MATERIAL**
- □ EXAMPLES OF EXTENT OF STUDENT LEARNING
- □ INSTRUCTOR REFLECTION ON THE COURSE