



**AAU**

**KING ABDULAZIZ UNIVERSITY  
ACADEMIC ASSESSMENT UNIT**

# **COURSE PORTFOLIO**

**FACULTY OF SCIENCE**

**MATHEMATICS DEPARTMENT**

**COURSE NAME: Topics in Algebra**

**COURSE NUMBER: Math 445**

**SEMESTER/YEAR: 2<sup>nd</sup> /2012**

**DATE: 2/23/2012**

## PART II



# COURSE SYLLABUS

*Chapter 1: Revision on definitions and elementary properties of Rings.*

*Chapter 2: Introduction to Rings Theory.*

\* *Ideals.*

\* *Homomorphisms and quotient rings.*

\* *Sum, direct sum and product of ideals.*

\* *Certain types of ideals.*

\* *Factorization in rings.*

*Chapter 3: Introduction to Modules Theory.*

\* *Modules and submodules.*

\* *Direct sums of modules and finitely generated modules.*

\*  *$R$ -homomorphisms and quotient modules.*

\* *Torsion and free modules.*

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### Instructor Information

✍ Name of the instructor: Wafaa fakieh

Office location:

✍ Office hours:

Saturday	Sunday	Monday	Tuesday	Wednesday
12:30-14:00	9:30-12:30	12:30-14:00	-----	-----

Contact number(s):

E-mail address: wfakieh@kau.edu.sa

Instructor's profile (optional)

A welcome letter to the student (optional)

### Course Information

Course name and number: Topics in algebra(445)

Course meeting times, places

Saturday	Sunday	Monday	Tuesday	Wednesday
-----	8:00-9:20	-----	8:00-9:20	-----

Place: Room 1131 Building: 7

Course website address

Course prerequisites and requirements

**Course name:** Abstract Algebra

**Course number:** 343

### Description of the course:

#### (What, why, philosophy, teaching, methodology)

- 1- Review: Rings and Subrings, Integral Domain and Ring homomorphism.
- 2- Ideals: Sum, Direct Sum and Product of Ideals.
- 3- Quotient Rings and Isomorphism theory.
- 4- Certain Types of Ideals: Principal Ideal, Prime Ideal and Maximal Ideal.
- 5- Factorization: Prime and irreducible elements and Unique factorization domains.
- 6- Modules: Submodules, Sum, Intersection and Direct Sum, Quotient Modules, R-homomorphism.
- 7- Some Special Classes of Modules: Finitely generated Modules, Torsion Modules and Free Modules.

### Course Objectives

- ✍ Students will be able to understand some basic properties of Ideals.
- ✍ Students will be able to recognize some elementary results about Prime and Irreducible elements, Euclidean Domain and Unique factorization domain.
- ✍ Students will be introduced to Modules; definition and examples.
- ✍ Students will be able to understand Quotient, Sum and Direct Sum of Modules

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### ***Learning Resources***

#### ***Textbooks:***

***1. Title: Contemporary Abstract Algebra***

***Author: Joseph A.Gallian***

***2. Title: Abstract Algebra***

***Author: John B.Fraleigh***

***3. Title: Abstract Algebra***

***Author: David S.Dummit/Richard M.Foote***

### ***Course Requirements and Grading***

#### **Student assessment:**

*(A clear rationale and policy on grading)*

*Test one 20%, Test two 20%, 10% Quizzes, Final 40% Homework and attendance 10%. The letter grading system (A B C D F +) will be used in this course. A = Excellent work. B = Good work. C = Acceptable work.*

*D = Marginally accepted work. F = Unacceptable work.*

#### **Expectations from students:**

*(Attitudes, involvement, behaviors, skills, and ethics)*

*The student must be quiet during lectures. The student must respect the teacher as well as other students in the same class. The student must be cooperative and helpful with others.*

#### **Student responsibilities to the course:**

*They all must be actively involved in the class. First, they must attend. Second they must share our thoughts. Students must do all home work. Students must attend all tests and quizzes.*

#### **Expectations for each assignment and project:**

#### **Important rules of academic conduct:**

#### **Lab plan and assignments:**

*(if it applies)*

### ***Detailed Course Schedule***

- ✍ Detailed contents of topics and activities planned for each class or lab session during the term.*
- ✍ Reading assignments for each topic.*
- ✍ Assignments and Exam due dates.*

*(The following pages include templates of tables for course schedule and practical sessions)*

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### Course Schedule Model (meeting two times a week)

Week #	Date	Topic	Reading Assignment	What is Due?
1	6/3	Introduction to the course	Chapter 1	Buy Book
	8/3			
2	13/3	Introduction to the course		Homework assignment #1
	15/3	Ideals	Chapter 2	
3	20/3	Homomorphisms and quotient rings	Chapter 2	
	22/3	Homomorphisms and quotient rings	Chapter 2	
4	27/3	Homomorphisms and quotient rings	Chapter 2	
	29/3	-----		
5	4/4	Solving problems	Chapter 2	
	6/4	Sum, direct sum of ideals	Chapter 2	
6	11/4	Certain types of ideals	Chapter 2	
	13/4	Certain types of ideals	Chapter 2	
7	18/4	Solving problems	Chapter 2	
	20/4	Factorization in rings	Chapter 2	
8	25/4	Factorization in rings	Chapter 2	
	27/4	Midterm exam		
9	9/5	Factorization in rings	Chapter 2	
	11/5	Factorization in rings	Chapter 2	
10	16/5	Solving problems		
	18/5	Modules and submodules	Chapter 3	
11	23/5	Direct sums of modules and finitely generated modules	Chapter 3	
	25/5	Direct sums of modules and finitely generated modules	Chapter 3	
12	1/6	R-homomorphisms	Chapter 3	
	3/6	Quotient modules	Chapter 3	

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Week #	Date	Topic	Reading Assignment	What is Due?
13	8/6	Quotient modules	Chapter 3	
	10/6	Torsion and free modules	Chapter 3	
14	15/6	Torsion and free modules	Chapter 3	
	17/6	Test(2)		
15	22/6	Solving problems		
	24/6	Review		
		<b>Final Exam all sections</b>		

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