



AAU

**KING ABDULAZIZ UNIVERSITY
ACADEMIC ASSESSMENT UNIT**

COURSE PORTFOLIO

**FACULTY OF SCIENCE
MATHEMTICS DEPARTMENT**

COURSE NAME: Abstract algebra I

COURSE NUMBER: Math 342

SEMESTER/YEAR: 2nd / 2012

DATE: 23/2/2012

PART II



COURSE SYLLABUS

I-Group and Subgroups

- 1) Binary Operations*
- 2) Definitions of Groups and Examples*
- 3) Elementary Properties of Groups*
- 4) Permutation Groups*
- 5) Subgroups*
- 6) Cosets*
- 7) Lagrange's Theorem*

II-Homomorphism's and Quotient Groups

- 1) Homomorphism's of Groups*
- 2) Normal Subgroup*

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- 3) *Quotient Groups*
- 4) *Isomorphism*
- 5) *Cayley's Theorem*
- 6) *Isomorphism Theorems*

III-Introductions to Rings



- 1) *Definitions of Rings*
- 2) *Fields*
- 3) *Subrings*
- 4) *Rings of polynomials*
- 5) *Rings of matrices*
- 6) *Rings quaternion*
- 7) *Homomorphism between Rings*

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Instructor Information

-  **Name of the instructor:** Dr.Wafaa Fakieh
 **Office location:** Faculty of Science, 3rd floor,
 **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.com

Course Information


-  **Course name and number:** Abstract algebra I Math 342
 **Course meeting times & places:**
- | | Time | Room |
|-----------------|---------------------|------|
| Lectures | 11:00-12:20 Sat/Mon | 65 C |
-  **Course prerequisites and requirements:** Math 251+ Math 241
 **Description of the course:** Elementary Properties of Groups- Permutation groups – Subgroups-Cosets-Lagrange's Theorem-Normal-Cayley's Theorem-Isomorphism Theorems - Definition of Rings and Examples-Fields – Subrings – Rings of Polynomials-Homomorphism between Rings.

Course Objectives

By the end of this course student will be expected to understand and be able to reproduce these proofs, as well as to apply the concepts and techniques covered to solve familiar and unfamiliar problems in algebra whose level is appropriate for this type of course. A student who successfully completes this course will

- * know the basic definitions for fundamental algebraic systems: groups, rings, fields;
- * be familiar with many simple examples of such systems;
- * be able to decide if a set (with operations) is such a system;
- * be familiar with the symmetric and alternating groups and be able to make effective calculations with Permutations;
- * be familiar with cyclic and abelian groups;
- * be able to test if a subset of a group is a subgroup, a normal subgroup;
- * be able to test if a subset of a ring is a subring.
- * be able to test if a mapping is a homomorphism (of groups, of rings).
- * understand the construction of factor groups and factor rings.
- * be able to calculate effectively in quotient rings of the integers and of polynomial rings over a field.

Learning Resources

-  The primary textbook for the course is
A First Course in Abstract Algebra, By John B. Fraleigh.
Contemporary Abstract Algebra, By Joseph A. Gallian.

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Course Requirements and Grading

Student assessment:



H.W	10%	On each tutorial session
Quiz	10%	
1st EXAM	20%	week 7
2nd EXAM	20%	week 13
FINAL EXAM	40%	End of the semester

Expectations from students:

- Students are expected to attend lectures on time.
- Students may discuss a homework assignment to clarify what is required. However, students may NOT share or copy each other work.
- Students are expected to prepare them self for each exam or quiz, and bring their own pens and calculator.

Student responsibilities to the course:

The student responsibilities are to:

- Attend all lectures, since the absence of 25% of the total lectures will prevent the student from attending the final exam.

Expectations for each assignment: To be done individually and honestly.

Detailed Course Schedule

Course Schedule Model (meeting two times a week)

Week #	Date	Topic	What is Due?
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Week #	Date	Topic	What is Due?
1	5/3	Introduction to the course	
	7/3		
2	12/3	Binary operations	
	14/3	Definitions of group	
3	19/3	Elementary properties of groups	
	21/3	Elementary properties of groups	
4	26/3	Subgroups	
	28/3	Cyclic groups	
5	3/4	Cosets	
	5/4	Permutation Groups	
6	10/4	Lagranges Theorem	
	12/4	Homomorphism of Groups	
7	17/4	Normal subgroup	
	19/4	Quotient Group	
8	24/4	Isomorphism	
	26/4	Cayleys Theorem	
9	8/5	Isomorphism Theorem	
	10/5	Definitions of Rings and examples	
10	15/5	Fields	
	17/5	Subrings	
11	22/5	Rings of polynomials	
	24/5	Rings of polynomials	
12	30/5	Rings of polynomials	
	2/6	Ring of Matrices	
13	7/6	Ring of Quaternion	
	9/6	Ring of Quaternion	
14	14/6	Homomorphism between Rings	

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Week #	Date	Topic	What is Due?
	12/6		
15	21/6	Solving problems	
	23/6	Review	
		Final Exam all sections	