King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences
SYLLABUS
Semester I, 2006-2007 (061)
(Prepared by: Dr. Abdulaziz M. Al-Assaf)
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Course #: Math 345
Title: Modern Algebra I
Prerequisite: Math 232
Textbook: Contemporary Abstract Algebra by J. A. Gallian, sixth edition (2006)
Objectives: This course is intended to introduce students to fundamental concepts and techniques in abstract algebra and to provide students with appropriate background for more advanced courses in mathematics.

Week #	Date	Chapter	Topics
1	Sep. 9 – 14*	2 3	**Groups**: Definitions , Examples, Elementary Properties **Finite groups; subgroups**: Terminology and notation, Subgroup Tests,
2	Sep. 16 – 20	3 4	Examples of Subgroups **Cyclic groups**: Properties of Cyclic Groups,
Saturday, September 23: National Holiday			
3	Sep. 24 – 27	4 5	Classification of Subgroups of Cyclic Groups **Permutation groups**: Definition & Notation, Cycle Notation,
4	Sep. 30 – Oct. 04	5 6	Properties of Permutations **Isomorphisms**: Definition & Examples, Cayley's Theorem,
5	Oct. 07 – 11	6 7	Properties of Isomorphisms, Automorphisms **Cosets and Lagrange's theorem**: Properties of Cosets, Lagrange's Theorem & Consequences
Thursday ,October 12 – Friday, October 27: Id Al-Fitr Vacation			
6	Oct. 28 – Nov.01	8 9	**External Direct Product**: Definition, Examples, Properties of Ex. Dir. Prod. **Normal subgroups and factor groups**: Normal Subgroups, Factor Groups
7	Nov. 04 – 08	9 10	Internal Direct Products **Group Homomorphisms**: Definition, Examples, Properties
8	Nov. 11 – 15	10 11	The First Isomorphism Theorem **Fundamental Theorem of Finite Abelian Groups**: The Fundamental Theorem, The Isomorphism Classes of Abelian Groups
9	Nov. 18 – 22	12	**Introduction to rings**: Definition, Examples, Properties of Rings, Subrings
10	Nov. 25 – 29	13	**Integral domains**: Definition, Examples, Fields, Characteristic of a Ring
11	Dec. 02 – 06	14	**Ideals and factor rings**: Ideals, Factor Rings, Prime and Maximal Ideals
12	Dec. 09 – 13	15	**Ring homomorphisms**: Definition, Examples, Properties of Ring Homomorphisms, The Field of Quotients
13	Dec. 16 – 20	16	**Polynomial rings**: Notation and Terminology, The Division Algorithm and Consequences
Thursday, December 21 – Friday, January 05: Id Al-Adha Vacation			
14	Jan. 06 – 10	17	**Factorization of polynomials**: Reducibility Tests, Irreducibility Tests, Unique Factorization in Z[x]
15	Jan. 13 – 17	18	**Divisibility in integral domains**: Irreducibles, Primes, Unique Factorization Domains. If TIME PERMITS.

* Thursday, September 14, 2006: Normal Saturday Classes.

Grading Policy:

1. TWO major exams (20% each)
   Dates for major exams:
   (i) Major exam I: Sunday, November 05,2006. It will cover Ch 2 – Ch 8.
   (ii) Major exam II: Tuesday, December 19, 2006. It will cover Ch 9 – Ch 15.
2. Final exam 40% (comprehensive)
3. Homework 20% (It will be given every week and must be submitted every Wednesday. Late homework will not be accepted.)
4. More than 9 unexcused absences will automatically translate to a DN grade.