

King Fahd University of Petroleum and Minerals

Department of Mathematical Sciences

SYLLABUS

Semester II, 2008-2009 (082)

Prepared by: Dr. Monther R. Alfuraidan

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Course # : Math 345 Title : Modern Algebra 1 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.

Web Site : <http://faculty.kfupm.edu.sa/math/monther>

Office hours : 12:00 – 1 PM SMW or by appointment

Week #	Date	Ch.	Topics
1	* Feb 28-5Mar	2 3	Groups, Definitions, Examples, Elementary Properties Finite Groups, Subgroups: Terminology and notation, subgroup tests.
2	Mar 7-11	3 4	Examples of Subgroups Cyclic groups: Properties of Cyclic Groups
3	Mar 14-18	4 5	Classification of Subgroups of Cyclic Groups Permutation groups: Notation & Definition, Cycle notation
4	Mar 21-25	5 6	Properties of Permutations Isomorphisms: Examples & Definition, Cayley's Theorem
5	Mar 28-1Apr	6 7	Properties of Isomorphisms, Automorphisms Cosets and Lagrange's theorem: Properties of Cosets, Lagrange's theorem & Consequences
6	Apr 4-8	8 9	External Direct Product: Definition, Examples, Properties of Ex. Dir. Prod. Normal subgroups and Factor Groups: Normal Subgroups, Factor groups
7	Apr 11-15	9 10	Internal Direct Products Group Homomorphisms: Definition, Examples, Properties
8	Apr 18-22	10 11	The First Isomorphism Theorem Fundamental Theorem of Finite Abelian Groups: The Fundamental Theorem, The Isomorphism Classes of Abelian Groups
Sat-wed	25 – 29	Apr	Mid term Vacation
9	May 2-6	12	Introduction to rings: Definition, Examples, Properties of Rings, Subrings
10	May 9-13	13	Integral Domains: Definition, Examples, Fields, Characteristic of a Ring.
11	May 16-20	14	Ideals and Factor Rings: Ideals, Factor Rings, Prime and Maximal Ideals.
12	May 23-27	15	Ring Homomorphism: Definition, Examples, Properties of Ring Homomorphisms, The Field of Quotients
13	May 30-3Jun	16	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences.
14	Jun 6-10	17	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in $\mathbb{Z}[x]$
15	Jun 13-17	18	Divisibility in Integral Domains: Irreducibles, Primes, Unique Factorization Domains.

- Thursday 5 March – Normal Wednesday Classes

Evaluation:

Exam I	Ch. 2,3,4,5,6&7	April 4, 2009	20%
Exam II	Ch. 8,9,10,11,12&13	May 13, 2009	20%
Homework		Weekly	20%
Final Exam	Comprehensive	To be announced	40%

There will be no "make-ups" for exams. *Unless a valid excuse is presented in advance, a missed exam or homework will receive the score 0. Of course, family vacations, commercial travel schedules, etc. are NOT acceptable excuses for missing scheduled classes. Students must look at this syllabus carefully and plan well ahead.*

Homework: A number of problems will be assign regularly. It is recommended that you try to work out these problems after the lecture. The problems in the exams will be similar to the homework problems. You are encouraged to come to my office hours or make an appointment to discuss any difficulties related to the course, including the homework problems. Remember that "The best way to learn Mathematics is to do Mathematics." Working as a group is recommended. However, each student needs to write his own solution.

Attendance: KFUPM policy with regard to attendance will be enforced. Students are expected to attend all class meetings and are responsible for all of the material covered. Any changes in this syllabus or in the scheduling of exams, homeworks, etc. will be announced during class meetings. Students who miss a class meeting should copy a classmate's notes for that meeting.

Help: Individuals' questions regarding the course work should be directed to the lecturer, either immediately after class or during scheduled office hours.