

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
SYLLABUS

Semester II, 2015-2016 (152)
(Dr. Abdeslam MIMOUNI)

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Course #: Math 345
Title: Modern Algebra I
Prerequisite: Math 232
Textbook: Contemporary Abstract Algebra by J. A. Gallian, eighth edition (2013)
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	Jan. 17-21	2 3	Groups, Definitions, Examples, Elementary Properties Finite Groups, Subgroups: Terminology and notation, Subgroup Tests
2	Jan. 24-28	3 4	Examples of Subgroups Cyclic groups : Properties of Cyclic Groups
3	Jan 31- Feb.04	4 5	Classification of Subgroups of Cyclic Groups Permutation groups: Notation&Definition, Cycle notation
4	Feb. 07-11	5 6	Properties of Permutations Isomorphisms: Examples& Definition, Cayley's Theorem
5	Feb.14-18	6 7	Properties of Isomorphisms, Automorphisms Cosets and Lagrange's theorem: Properties of Cosets, Lagrange's Theorem & Consequences
6	Feb. 21-25	8 9	External Direct Product: Definition, Examples, Properties of Ex. Dir. Prod. Normal subgroups and Factor groups: Normal Subgroups, Factor groups
7	Feb. 28- Mar. 03	9 10	Internal Direct Products Group Homomorphisms: Definition, Examples, Properties
8	Mar. 06-10	10 11	The First Isomorphism Theorem Fundamental Theorem of Finite Abelian Groups: The Fundamental Theorem, The Isomorphism Classes of Abelian Groups
March 11-19: Med-Term Vacation			
9	Mar. 20-24	12	Introduction to rings: Definition, Examples, Properties of Rings, Subrings
10	Mar. 27-31	13	Integral Domains: Definition, Examples, Fields, Characteristic of a Ring.
11	Apr. 03-07	14	Ideals and Factor Rings: Ideals, Factor Rings, Prime and Maximal Ideals.
12	Apr. 10-14	15	Ring Homomorphism: Definition, Examples, Properties of Ring Homomorphisms , The Field of Quotients
13	Apr. 17- 21	16	Polynomial Rings: Notation and Terminology, The Division Algorithm and Consequences.
14	Apr. 24-28	17	Factorization of Polynomials: Reducibility Tests, Irreducibility Tests, Unique Factorization in $\mathbb{Z}[x]$
15	May 01-05	18	Divisibility in Integral Domains: Irreducibles, Primes, Unique Factorization Domains.

Homework

<i>Chapter 2</i>	<i>Exercises: 22-34-52</i>
<i>Chapter 3</i>	<i>Exercises: 4-12-32</i>
<i>Chapter 4</i>	<i>Exercises: 14-20-42</i>
<i>Chapter 5</i>	<i>Exercises: 22-26-38</i>
<i>Chapter 6</i>	<i>Exercises: 2-10-42</i>
<i>Chapter 7</i>	<i>Exercises: 6-12-48</i>
<i>Chapter 8</i>	<i>Exercises: 6-22-38</i>
<i>Chapter 9</i>	<i>Exercises: 10-38-48</i>
<i>Chapter 10</i>	<i>Exercises: 6-14-20</i>
<i>Chapter 11</i>	<i>Exercises: 2-8-22</i>
<i>Chapter 12</i>	<i>Exercises: 4-8-12</i>
<i>Chapter 13</i>	<i>Exercises: 14-30-46</i>
<i>Chapter 14</i>	<i>Exercises: 14-16-26</i>
<i>Chapter 15</i>	<i>Exercises: 12-24-52</i>
<i>Chapter 16</i>	<i>Exercises: 4-10-20</i>
<i>Chapter 17</i>	<i>Exercises: 10-20-30</i>
<i>Chapter 18</i>	<i>Exercises: 4-12-28</i>

Grading Policy.

Homework:	<u>Out of: 60.</u>
Major Exam 1: February 23, 2016, Chapters 2-6.	<u>Out of: 100.</u>
Major Exam 2: March 23, 2016, Chapters 7-11.	<u>Out of: 100.</u>
Final Exam: Announced by the Registrar.	<u>Out of: 140.</u>
Total:	<u>Out of: 400.</u>