

**SYLLABUS AND POLICY**

Course : **Math 345**  
 Title : **Modern Algebra I**  
 Textbook : Contemporary Abstract Algebra, by Joseph A. Gallian, 8<sup>th</sup> edition.  
 Objective : Introduce students to the basic notions and techniques of Abstract Algebra.

Part	Weeks	Section	Topics
1. Groups	1-8	2	Groups
		3	Finite groups and subgroups
		4	Cyclic groups
		5	Permutation groups
		6	Isomorphisms
		7	Cosets and Lagrange's Theorem
		8	External direct products
		9	Normal subgroups and factor groups
		10	Group homomorphisms
		11	Fundamental theorem of finite abelian groups
2. Rings	9-15	12	Introduction to rings
		13	Integral domains
		14	Ideals and factor rings
		15	Ring homomorphisms
		16	Polynomial rings
		17	Factorization of polynomials
		18	Divisibility in integral domains

**Grading Policy:**

Homework (6 Assignments = 60 Exercises)	20%	---
Exam 1 (Duration = 90 minutes)	20%	<b>Monday, April 06 at 7:00 p.m. Room: 4 - 101</b>
Exam 2 (Duration = 90 minutes)	20%	<b>Monday, May 11 at 7:00 p.m. Room: 4 - 101</b>
Final Exam (Duration = 180 minutes)	40%	<b>Monday, May 18 at 7:00 p.m. Room: tba</b>

HW Assignments	Part	Sections	Latest Date for Submission
HW 1	1. Groups	2-5	Thursday, February 26
HW 2		6-8	Thursday, March 12
HW 3		9-11	Thursday, March 26
HW 4	2. Rings	12-13	Thursday, April 16
HW 5		14-15	Thursday, April 30
HW 6		16-17	Thursday, May 07

**Learning Outcomes:**

Upon completion of this course, students should be able to

- Understand normal subgroups, factor groups, homomorphisms
- Understand the fundamental theorem of finite Abelian groups
- Understand integral domains and fields
- Understand ideals, factor rings and ring homomorphisms
- Understand factorization of polynomials over a field, factor rings of polynomials over a field
- Understand irreducible elements and unique factorization
- Understand principal ideal domains

**University Policy on Cheating & Plagiarism:**

*“All academic work or requirements assigned to a student must be carried out by him without any unauthorized aid of any kind. ... If any instance of dishonesty by a student in homework assignments or any other requirements of the course is discovered by an instructor, it is his responsibility to take appropriate action.”* [Undergraduate Bulletin, Page 49]

It must be understood that any student who knowingly aids in plagiarism or other cheating, e.g., allowing another student to copy a homework or exam question, is as guilty as the cheating student.

**Office Hours and Contact Information:**

**Office hours** : Sunday/Tuesday/Thursday 10:00-11:00 a.m.

**Teacher** : Salah-Eddine Kabbaj, Office location: 5-428, Email: [kabbaj@kfupm.edu.sa](mailto:kabbaj@kfupm.edu.sa)

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