King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 551 - Abstract Algebra - Syllabus

DESCRIPTION: Basic definitions of rings and modules, Homomorphisms, Sums and products, Exactness, Hom and tensor, Adjoint isomorphism, Free, projective and injective modules. Chain conditions, Primary decomposition, Noetherian rings and modules, Artinian rings, structure theorem.
PREREQUISITE: MATH 345.

TEXTBOOK: ALGEBRA, Revised Third Edition by Serge Lang

PACING:

Section	**Material**
II.1	Rings and homomorphisms
II.2	Commutative rings
II.3	Group rings and monoid rings
II.4	Localization
III.1	Basic definitions of modules
III.2	The group of homomorphisms
III.3	Direct products and sums of modules
III.4	Free modules and projective modules
III.7	Modules over principal rings
III.9	The snake lemma
XVI.1-3	Tensor products and flatness
XX.4	Injective modules
X.1	Noetherian rings and modules: basic criteria
X.2	Associated primes
X.3	Primary decomposition
X.4	Nakayama's lemma
X.7	Indecomposable modules
IV.4	Hilbert's basis problem
XVII.2	Semisimplicity
XVII.4	Semisimple rings and structure results

GRADING POLICY:

Midterm Exam	II.1 - III.9	35%
Final Exam	XVI.1 - XVII.4	35%
Homework	Assigned	15%
Project/Oral Exam	Assigned	15%