

MATH 551 Abstract Algebra

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, by Serge LANG, Revised Third Edition

SYLLABUS

Week	Section	Material
1	II.1	Rings and homomorphisms
	II.2	Commutative rings
2	II.3	Group rings and monoid rings
	II.4	Localization
3	III.1	Basic definitions of modules
	III.2	The group of homomorphisms
4	III.3	Direct products and sums of modules
	III.4	Free modules and projective modules
5	III.7	Modules over principal rings
6	III.7	Modules over principal rings (cont.)
	III.9	The snake lemma
7	XVI.1-2-3	Tensor products and flatness
8	XX.4	Injective modules
9	X.1	Noetherian rings and modules: basic criteria
10	X.2	Associated primes
11	X.3	Primary decomposition
	IV.4	Hilbert's basis theorem
12	X.4	Nakayama's lemma
13	X.7	Indecomposable modules
14-15	XVII.2	Semisimplicity
	XVII.4	Semisimple rings and structure results

GRADING POLICY

Homework	-	15%
Mid-term Exam	II.1 – III.9	35%
Final Exam	XVI.1 – XVII	35%
Final Project*/Oral Exam	Assigned	15%

(*) The final project should reflect your knowledge of the topic as well as your skills in proof-writing and oral communication. Do not quote the prose directly from the textbook (or any other source). Rather, absorb the idea, research it, and write about it in your own voice. The project should be about 5-8 pages and typed in **LaTeX** (in **AMS article style**).