

DEPARTMENT OF MATHEMATICS

SYLLABUS

Course # & Name: MAT 150B: Introduction to Abstract Algebra

Recommended Text(s) & Price: Michael Artin's "Algebra, 1st Edition"
 (\$114.00)

Prepared by: Mulase/Fuchs/Li/Schwarz UPC Approval Spring 2003
 (Updated by Vazirani, Date: (Updated
 Kuperberg, and Schwarz) 5/18/2006)

Lecture(s)	Sections	Comments/Topics
Week 1		Definition of Bilinear Forms (Note: Math 67 covers inner products); Symmetric Forms – orthogonality the Geometry associated to a symmetric form.
Week 2		Hermitian Forms (Note: Math 67 covers Hermitian matrices); The Spectral Theorem.
Week 3		The classical linear groups; The special unitary group (Note: Math 67 covers unitary matrices); Orthogonal representation of SU2.
Week 4		SL(2); Abstract Fields; Matrix groups and linear algebra over abstract fields (from Chap. 3 of Artin); Definition of Rings.
Week 5		Formal construction of integers and polynomials; Homomorphisms and Ideals; Quotient rings and relations in a ring.
Week 6		Integral domains and fraction fields; Maximal ideals; Factorization of integers and polynomials.
Week 7		Unique factorization domains, principal ideal domains, and Euclidean domains; Gaussian integers; Primes.
Week 8		Ideal factorization; Definition of modules; Matrices, free modules and bases.
Week 9		Diagonalization of integer matrices; Generators and relations for modules; Structure theorem for Abelian groups.
Week 10		Application to linear operators.

Additional Notes:

The class is based primarily on Chapters 7, 8, 10, and 11 of Artin's book.

If there is extra time, continue with Chapter 11 of Artin (modules), or go back and fill in topics such as:

8.6 The Lie Algebra

8.7 Simple Groups

10.5 Adjunction of Elements