

MAT 535, ALGEBRA II, Spring 2001

LECTURES: Tu-Th 12:50-14:10, MATH TOWER P-131

INSTRUCTOR: Mark de Cataldo; Office: MAT 3-115 (math building, third floor, room 115); Phone: 2-8262; e-mail: *mde@math.sunysb.edu*

OFFICE HOURS: By appointment.

TEXTBOOK: T.W. Hungerford, *Algebra*, GTM 73, Springer-Verlag New York 1974. Other typical references: Michael Artin, *Algebra*, Prentice Hall, Englewood Cliffs, NJ 1991. Serge Lang, *Algebra*, 2nd ed.; Addison-Wesley, Menlo Park, CA 1984. Nathan Jacobson, *Basic algebra*, vol. 1, 2nd ed. W.H. Freeman and Co, San Francisco 1985. Van der Waerden, *Algebra 1*, 9th ed.; Springer-Verlag, 1994.

TENTATIVE SYLLABUS (subject to changes):

1. Advanced group theory

Structure of finitely generated abelian groups Sylow theorems Free groups Groups given by generators and relations.

2. Rings and modules

Rings and fields, examples Homomorphisms, subrings, ideals, quotients, isomorphism theorems Vector spaces and modules, examples Polynomial rings, polynomial functions, factor theorem Integral domains, prime and maximal ideals, field of fractions Principal ideal domains ("PID"), unique factorization theorem Structure theorem for finitely generated modules over PID, examples Tensor, symmetric and exterior algebras as algebras

3. Fields and Galois theory

Algebraic elements Construction of field extensions Characteristics, finite fields Geometric constructions by ruler and compass Algebraic closure Splitting field of a polynomial, examples Normal and separable extensions, automorphisms of field extensions Fundamental theorem of Galois theory Applications: construction of regular polygons, fundamental theorem of algebra, nonsolvable equations

FINAL EXAM: There will be a final "take-home" exam. Dates to be announced.

HOMEWORK: Homework will be assigned and graded weekly. Homework is due on tuesdays **in class**. No exceptions.

GRADE: Based on the final, homework and participation.

SPECIAL NEEDS. If you have a physical, psychiatric, medical, or learning disability that may affect your ability to carry out the assigned course work, please contact the office of Disabled Student Services (DSS), Humanities Building, room 133, telephone 632-6748/TDD. DSS will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential.