

SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

SYLLABUS (*Tentative*)

MATH 442/562 *Abstract Algebra II*

**Objective:** To develop the foundations for modern algebra. The primary focus will be on constructing proofs and writing in mathematics. The standard theory of a second semester algebra course will be presented.

**Intended for:** All majors in the mathematical sciences and any students who wish to pursue graduate study in mathematics or its applications, physics or computer science.

**Prerequisite:** MATH 441 with a grade of C or better.

**Texts:** “A First Course in Abstract Algebra,” by John Fraleigh; Addison Wesley, 7<sup>th</sup> edition, 2003.  
 “Abstract Algebra and Solution by Radicals,” by Maxfield and Maxfield; Dover Publications, 1992.

	<b>Weeks</b>
<b><i>Groups and the Structure of Groups</i></b>	2.0
Additional topics on group structure.	
<b><i>Introduction to Rings</i></b>	3.0
Mathematical theory of a ring, subring, integral domain, field and division ring. Interconnections between these algebraic structures. Commutative and noncommutative rings. Zero Divisors, characteristic and other fundamental ring theoretic topics.	
<b><i>Polynomials</i></b>	3.0
Polynomials, division algorithm, factorization, units, associates, unique factorization domains.	
<b><i>Quotient Rings</i></b>	3.0
Ring homomorphisms, ideals, and quotient rings. Fundamental Homomorphism Theorem for Rings. Quotients of polynomial rings.	
<b><i>Field Theory</i></b>	2.0
Vector Spaces, Extension Fields, Finite Fields, Polynomial Roots, an introduction to Galois Theory, Solvability by Radicals, the Insolvability of the Quintic, Impossible Geometric Constructions.	
<b><i>Tests / Additional Topics</i></b>	<u>1.0</u>
	14.0

**EVALUATION**

Homework	60% - 100%
Tests	0% - 40%
Final	0% - 25%