

Math 420: Abstract Algebra

(Adopted - Spring 2016; Committee: Drs. J. Parish, M-S. Song, G.S. Staples)

Catalog Description: [PS, DNSM] Rings, fields, integral domains, homomorphisms, factor rings, rings of polynomials, prime ideals, maximal ideals, extension fields, and vector spaces. Prerequisite: 320 with grade of C or better or consent of instructor.

Textbook: Contemporary Abstract Algebra 9th Edition, Joseph A. Gallian, 2013, CENGAGE Learning

Learning Objectives: By the end of this course students will

- Recognize examples of rings and fields, particularly as they relate to other areas of mathematics.
- Understand the way rings and fields arise from and reflect concepts such as geometric constructions, factorization of polynomials, and vector spaces.
- Know the definitions of basic terms, such as: ring, field, integral domain, ideal, extension field, vector space, and homomorphism.
- Be able to construct proofs involving rings and fields.

Course Outline and Topics

Part 3 Rings
12 Introduction to Rings
13 Integral Domains
14 Ideals and Factor Rings
15 Ring Homomorphisms
16 Polynomial Rings
17 Factorization of Polynomials
18 Divisibility in Integral Domains
Part 4 Fields
19 Vector Spaces
20 Extension Fields
21 Algebraic Extensions
22 Finite Fields
23 Geometric Constructions

Any instructor should cover all of the required sections.

It is recommended that one optional topic from Part 5 of the textbook also be included.