

Syllabus

**Math 01.527 - Abstract Algebra II**

**CATALOG DESCRIPTION:**

**Math 01.527 Abstract Algebra II 3 s.h.**

(Prerequisite: Math 01.340 Modern Algebra or Math 01.524 Abstract Algebra I)

The continuation of Abstract Algebra I covering advanced material from group theory, ring theory and field theory.

**CONTENT:**

**1. Group Theory**

- 1.1 Normal group
- 1.2 Fundamental Theorem of Group (Quotient Group)
- 1.3 Group isomorphism theorems
- 1.4 Cauchy's Theorem for abelian groups
- 1.5 Group automorphism
- 1.6 Cayley's Theorem
- 1.7 Permutation groups
- 1.8 Sylow's Theorem

**2. Ring Theory**

- 2.1 Ideal and prime ideals
- 2.2 Euclidean rings and principle ideal rings
- 2.3 Polynomial factorization theorem
- 2.4 Polynomials and zeros of a polynomial
- 2.5 Irreducibility criteria

**3. Theory of Fields**

- 3.1 Subfields and prime fields
- 3.2 Field adjunction
- 3.3 Simple field extensions
- 3.4 Linear dependence over a skew field
- 3.5 Linear equations over a skew field
- 3.6 Algebraic field extensions
- 3.7 Normal extension fields
- 3.8 Roots of unity
- 3.9 Finite commutative fields (Galois fields)
- 3.10 Separable and inseparable extensions
- 3.11 Perfect and imperfect fields

**TEXTS:**

Fraleigh, J.B., *A FIRST COURSE IN ABSTRACT ALGEBRA*, Addison Wesley Longman, 1999.

Burton, David, *ABSTRACT ALGEBRA*, W.C. Brown Publishing Co., Dubuque, IA, 1990.

Herstein, I.N., *ABSTRACT ALGEBRA*, Second Ed., Macmillan, New York, 1990.

Pedersen, Franklin, *MODERN ALGEBRA*, W.C. Brown Publishing Company, Dubuque, IA, 1993.