CC2-N1 Group Theory And Ring Theory

1. Groups

1.1 Binary Operation
1.2 Isomorphic Binary Structures
1.3 Groups

2. Subgroups

2.1 Subgroups
2.2 Cyclic Groups

3. Permutations

3.1 Groups of Permutations
3.2 Orbits
3.3 Cycles
3.4 Alternating Groups
3.5 Cosets and the Theorem of Lagrange
3.6 Direct Products

4.Homomorphisms and Factor Groups

4.1 Homomorphisms
4.2 Factor Groups
4.3 Factor Group Computations and Simple Groups

5.Rings and Fields

5.1 Ring, Subring, Fields.
5.2 Divisors of zero, Integral Domain, The Characteristics of a Ring.
5.3 The Field of Quotients of an Integral Domain.

6. Rings of Polynomials & Factorization

6.1 Polynomials in an determinate,
6.2 The Evaluation Homomorphism Zeros.
6.3 Factorization of a Polynomial over a Field: The Division Algorithm in F[x]
6.4 Irreducible Polynomials, Uniqueness of Factorization in F[x].

7. Ideals and Factor Rings

7.1 Homomorphism, Properties of Homomorphism
7.2 Ideals, Factor Ring, Fundamental Homomorphism Theorem.
7.3 Maximal Ideal, Prime Ideal, Ideal Structure in F[x].

8. Factorization

8.1 Unique Factorization Domain, Principal Ideal Domain, Gauss Lemma, D[x] is a UFD.
8.2 Euclidean Norm, Euclidean Domain, Euclidean Algorithm (Without Proof).
8.3 Gaussian Integers, Multiplicative Norm.