

CS 203: Algebra (Modular Course)

1. Objectives: to appreciate the power of abstraction in devising solutions to problems of interest in general and computer science in particular; to develop ability of using algebraic objects like groups, rings, and fields.
2. Prerequisites: None
3. Course Contents:
 - a. Need for algebraic abstraction, abstraction of arithmetic [2]
 - b. Groups, subgroups, quotient groups, homomorphisms, Burnside's Lemma [4]
 - c. Rings as extension of integers, failure of unique factorization, ideals and restoration of unique factorization [3]
 - d. Ring homomorphisms, quotient rings, principle ideals, prime ideals, and maximal ideals [3]
 - e. Fields, finite fields and their basic properties [2]
 - f. Example: realization of reals as quotient of Cauchy sequences [1]
 - g. Example: Reed-Solomon error correcting codes using finite fields and their usage [2]
 - h. Example: Development of algebraic geometry and proof of Pascal's Theorem [3]
4. Special Emphasis: Power of abstraction
5. Lectures: Tue, Wed, Fri 12-13 hrs in RM 101
6. Office Hours: Sat 15-17 hrs
7. Evaluation Components & Policies: One exam (weightage 60%), five assignments (weightage 40%)
8. Course Policies: no attendance; copying in an assignment will result in zero marks for all assignments; copying in exam will result in zero marks in the exam; withdrawal allowed as per DOAA guidelines
9. Books & References:
 - a. Abstract Algebra: Theory and Applications, Thomas H. Judson, <http://abstract.ups.edu/download/aata-20160809.pdf>
 - b. Abstract Algebra, I. M. Herstein, Wiley