

Discrete Mathematics 1

Course Description: An introduction to topics in discrete mathematics, including logic, set theory, functions and sequences, methods of proof, algorithms, number theory, counting, and discrete probability.

Course Objectives:

1. Apply logic to simple and compound statements, predicates, quantified statements, and arguments. This includes symbolic analysis, truth tables, and determining validity of arguments.
2. Construct direct, indirect, counterexample, contrapositive, and induction proofs in a variety of discrete mathematical settings.
3. Prove propositions in number theory such as those involving divisibility, properties of rational numbers, Fundamental Theorem of Arithmetic, and prime numbers.
4. Trace the execution of basic algorithms encountered in programming & number theory.
5. Compute individual terms of a sequence and determine a formula for the general term for elementary cases. Use summation and product notation correctly.
6. Prove set theoretic concepts involving subsets, set operations, equality, Cartesian products, and power sets.
7. Determine the domain, co-domain, image, and inverse image of a function defined on a given set.
8. Prove function propositions involving equality of functions, onto functions, one to-one functions, and inverse functions.
9. Identify and use appropriate counting techniques, such as multiplication and addition rules, inclusion/exclusion rules, permutations and combinations, in applications, in particular in computing probabilities of events.