

# TENTATIVE OUTLINE

## (1) **Propositional Calculus**

Truth Tables and the Propositional Calculus (Chapter 1.1 and 1.2)

Arguments and Testing for Validity (Chapter 1.3)

Negation Normal Form, Conjunctive Normal Form, Disjunctive Normal Form (Handout)

Digital Circuits, Logical Completeness, and Karnaugh Maps (1.4, 1.5, and Handout)

## (2) **Lower Predicate Calculus**

Predicates and the Universal and Existential Quantifiers (2.1, 2.2)

Multiple Quantifiers, Order of Quantifiers, and Negation (2.3)

Arguments and Testing for Validity

## (3) **Naïve Set Theory**

Union, Intersection, Complements, and Cartesian Products (5.1)

De Morgan's Laws (5.2)

Power Sets and the Number of Subsets (5.3)

Boolean Algebra and the Relationship to the Lower Predicate Calculus

## (4) **Combinatorics and Induction**

Combinations and Permutations (Chapter 6.2, 6.3, 6.4, 6.5)

Binomial Theorem, Pascal's Triangle, and Induction (Chapters 4.2, 4.4, 6.7)

Conditional Probability and Bayes' Formula (6.9)

## (5) **Functions and Relations**

Definition of a Function (7.1)

Composition of Functions (7.4)

Injective Functions, Surjective Functions, and Invertibility (7.2)

Relations (10.1)

Reflexivity, Symmetry, and Transitivity (10.2)

Equivalence Relations and Partitions (10.3)

Partial Orders and Hasse Diagrams (10.5)