

Tentative Outline:

We will cover at least the following sections:

- 1.1: Variables
- 1.2: The Language of Sets
- 2.1: Logical Form and Logical Equivalence
- 2.2: Conditional Statements
- 2.3: Valid and Invalid Arguments
- 2.4: Application: Digital Logic Circuits
- 2.5: Application: Number Systems and Circuits for Addition
- 3.1: Predicates and Quantified Statements I
- 3.2: Predicates and Quantified Statements II
- 3.3: Statements with Multiple Quantifiers
- 3.4: Arguments with Quantified Statements
- 4.1: Direct Proof and Counterexample I: Introduction
- 4.3: Direct Proof and Counterexample III: Rational Numbers
- 4.4: Direct Proof and Counterexample IV: Divisibility
- 4.5: Direct Proof and Counterexample V: Division into Cases and the Quotient-Remainder Theorem
- 4.6: Direct Proof and Counterexample VI: Floor and Ceiling
- 4.7: Indirect Argument: Contradiction and Contraposition
- 4.8: Indirect Argument: Two Famous Theorems
- 4.10: Application: Algorithms
- 5.1: Sequences
- 5.2: Mathematical Induction I: Proving Formulas
- 5.3: Mathematical Induction II: Applications
- 5.4: Strong Mathematical Induction and the Well-Ordering Principle for the Integers
- 6.1: Set Theory: Definitions and the Element Method of Proof
- 6.2: Properties of Sets
- 6.3: Disproofs and Algebraic Proofs

Additionally, we will include selected material from the following chapters as time permits:

- Ch. 7: Properties of Functions
- Ch. 8: Properties of Relations
- Ch. 9: Counting and Probability
- Ch. 10: Theory of Graphs and Trees