

**CIS 11: Course Outline**  
**Text - Discrete Mathematics 5th ed.**  
**by - K. Ross & C. Wright (Prentice Hall)**

**Weeks 1 & 2: Sets, Sequences, and Functions**

Set Operations; Functions; Inverses of Functions; Sequences.

**H.W. - Chapter 1:**

- 1.3 - 1, 3, 5, 9, 11, 13 (Special Sets)
- 1.4 - 1, 3, 5, 7, 11, 13 (Set Operations)
- 1.5 - 1, 3, 5, 7, 8, 13 (Functions)
- 1.6 - 1, 3, 5, 7, 9 (Sequences)
- 1.7 - 1, 3, 5, 7, 11 (Properties of Functions)

**Weeks 3 & 4: Elementary Logic**

Propositional Calculus; Methods of Proof; Analysis of Arguments.

**H.W. - Chapter 2:**

- 2.1 - 1, 9, 15 (Introduction)
- 2.2 - 1, 3, 5, 7, 9, 19 (Propositional Calculus)
- 2.3 - 5, 7, 9, 13 ((Proofs)
- 2.4 - 1, 3 (Methods of Proofs)
- 2.5 - 1, 3, 7, 9, 17 (Logic in Proofs)
- 2.6 - 1, 5, 9a,c, 13 (Analysis of Arguments)

**Examination #1:**

**Weeks 5 & 6: Relations**

Relations; Digraphs and Graphs; Matrices; Equivalence Relations and Partitions.

**H.W. - Chapter 3:**

- 3.1 - 1, 3, 9, 11, 13 (Relations)
- 3.2 - 1, 3, 9, 10, 11, 15 (Digraohs and Graphs)
- 3.3 - 3, 5, 11, 15 (Matrices)
- 11.3 - 1, 7, 11 (Multiplication of Matrices)
- 3.4 - 1, 5, 7, 13, 15 (Equivalence Relations and Partitions)
- 3.5 - 1, 3, 5, 15 (The Division Algorithm and integers Mod p)

**Weeks 7 & 8: Induction and Recursion**

Loop Invariants; Mathematical Induction; Recursive Definitions; Recurrence Relations.

**H.W. - Chapter 4:**

- 4.1 - 9, 11, 17, 19, 21 (Loop Invariants)
- 4.2 - 1, 5, 7, 13, 17, 19 (Mathematical Induction)
- 4.4 - 1, 3, 7, 9, 17 (Recursive Definitions)
- 4.5 - 1, 3, 7, 11, 15 (Recurrence Relations)
- 4.6 - 1, 7, 11, 13 (More Induction)

**Weeks 9 & 10: Counting**

Basic Counting Techniques; Elementary Probability; Inclusion-Exclusion Principle; Binomial Methods; Counting and Partitions; Independence; Bayes Formula.

**H.W. - Chapter 5**

- 5.1 - 1, 3, 7, 9, 11, 15 (Basic Counting Techniques)
- 5.2 - 1, 3, 5, 7, 9, 15, 19 (Elementary Probability)
- 5.3 - 1, 3, 7, 9, 15, 17 (Inclusion-Exclusion and Binomial Methods)
- 5.4 - 1, 3, 5, 9, 11 (Counting and Partitions)
- 9.1 - 1, 3, 7, 9, 13, 17, 19 (Independence in Probabilty and Bayes Formula)

**Examination #2:**

**Weeks 11 & 12: Boolean Algebra**

Boolean Algebras; Boolean Expressions; Logic Networks; Karnaugh Maps; Isomorphism.

**H.W. - Chapter 10:**

- 10.1 - 5, 7 (Boolean Algebra)
- 10.2 - 1, 3, 7 (Boolean Expressions)
- 10.3 - 1, 3 (Logic Networks)
- 10.4 - 1, 5, 7, 9 (Karnaugh Maps)
- 10.5 - 1, 3, 5 (Isomorphism)

**Weeks 13 & 14: Introduction to Graphs and Trees**

Graphs; Edge Traversal Problems; Trees; Rooted Trees; Vertex Traversal Problems; Minimum Spanning Trees.

**H.W. - Chapter 6:**

- 6.1 -
- 6.2 -
- 6.3 -
- 6.4 -
- 6.5 -
- 6.6 -

**Final Examination:**

**Notes:**

Solutions to the homework problems for each chapter are available in the back of the text (see pg. 538).