

# North Hennepin Community College

## CSCI 2010: Discrete Mathematical Structures

### A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: \*.\*

Lab Hours/Week: \*.\*

OJT Hours/Week: \*.\*

Prerequisites:

This course requires any of these three prerequisites

Placement into MATH 1170 or MATH 1200

Placement into MATH 1221

MATH 1150 - College Algebra (Minimum grade: 1.67 GPA Equivalent)

Corequisites: None

MnTC Goals: Goal 02 - Critical Thinking, Goal 04 - Mathematical/Logical Reasoning

The course covers mathematical topics essential for work in computer science. Topics include: number bases, mathematical induction, sets, relations, functions, congruence, recursion, combinations and permutations, probability, graphs, trees, logic, Boolean algebra, and proof techniques. Computing related problems and examples are integrated throughout the course.

Prerequisites: MATH 1150 College Algebra (Minimum grade: 1.67 GPA Equivalent) Or A score of 79 or higher on the College Level Math (0167) placement test Or An ACT math score of 26 or higher.

Recommended: Any CSCI course numbered 1030 or above (Minimum grade: 1.67 GPA Equivalent)

**B. COURSE EFFECTIVE DATES:** 08/27/1997 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. See Course Description and Course Outcomes

### D. LEARNING OUTCOMES (General)

1. Describe how symbolic logic can be used to model real-life situations or applications, including those arising in computing contexts such as software analysis (e.g., program correctness), database queries, and algorithms. (MnTC G4 abd, ELO 1, 2)
2. Examine the logical validity of arguments and proofs as they apply to Boolean expressions. (G2abc, G4bc, ELO 1, 2)
3. Apply mathematical induction and other techniques to prove mathematical results. (G2abc, G4bc, ELO 1, 2)
4. Perform computations using recursively defined functions and structures. (G4ad, ELO 1, 2)
5. Solve problems involving sets, relations, functions, and congruences. (G2abc, G4ad, ELO 1, 2)
6. Illustrate the basic terminology and properties of graphs and trees. (G4b, ELO 1, 2)
7. Use graphs and trees to solve problems algorithmically. (G4ad, ELO 1, 2)
8. Use methods of combinatorics to solve counting and basic probability problems. (G2abc, G4ad, ELO 1, 2)
9. Perform binary and hexadecimal conversions of numbers. (ELO 1, 2)
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## **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

### Goal 02 - Critical Thinking

1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.
2. Imagine and seek out a variety of possible goals, assumptions, interpretations, or perspectives which can give alternative meanings or solutions to given situations or problems.
3. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.

### Goal 04 - Mathematical/Logical Reasoning

1. Illustrate historical and contemporary applications of mathematical/logical systems.
2. Clearly express mathematical/logical ideas in writing.
3. Explain what constitutes a valid mathematical/logical argument(proof).
4. Apply higher-order problem-solving and/or modeling strategies.

## **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

## **G. SPECIAL INFORMATION**

None noted