MISSOURI WESTERN STATE UNIVERSITY
COLLEGE OF LIBERAL ARTS AND SCIENCES
DEPARTMENT OF COMPUTER SCIENCE, MATHEMATICS, AND PHYSICS

CLASS SYLLABUS

I.   Course Number   Course Name   Schedule   Credit
         CSC208   Discrete Structures I   MWF 9:00AM-9:50AM   3

II.   Prerequisites: Credit with a grade of C or better or concurrent enrollment in both
         MAT177 and CSC184.

III.   Course Description: This course is a study of mathematical reasoning including the nature
         and methods of proof, relations and functions, combinatorics and graph theory, Boolean
         algebra, and applications of these topics. Attention will be given to the direct applications
         to computer science. Same as MAT208.

IV.   Text: *Mathematical Structures for Computer Science*, 7th edition, Judith L. Gersting, W. H.
         Freeman, 2014, ISBN-10: 1429215100 or ISBN-13: 978-1429215107.
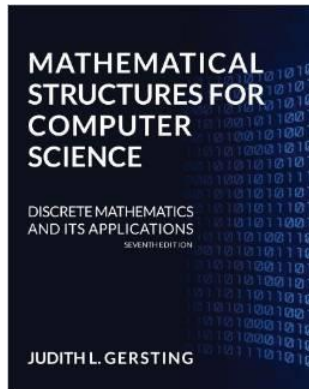
V.   Course Objectives:

         The goal of this course is to provide students with skills and experience in the following
         areas:

         a. Formal Logic
         b. Counting
         c. Functions
         d. Induction and Recurrence
         e. Graph and Trees

VI.   Course Outline:

     I.   Preliminary Formal Logic
              1.   Statement and Logic

2. Logical Connectives
3. Truth Tables
4. Tautology and Contradiction
5. De Morgan's Law
6. Variables, Quantifiers and Predicates

II. Sets, Combinatorics, and Probability
1. Set Theory
2. Counting
3. Principle of Inclusion and Exclusion
4. Counting Permutations & Combinations
5. Pascal Triangles and Binomial Theorem
6. Introduction to Finite Probability

III. Relations, Functions, and Matrices
1. Types of Relations
2. Equivalence Relation
3. Topological Sorting
4. ER Model in Database
5. Functions
6. Matrix

IV. Induction, Recursion, and Recurrences
1. Mathematical Induction
2. Recursion, Recurrences, and Induction
3. Growth Rates of Solutions to Recurrences
   a. Big-O notations

V. Graphs and Trees
1. Graph Terminology
2. Tree Terminology
3. Tree Traversal Algorithms
4. Huffman Encoding
5. Eulerian and Hamiltonian Graphs