

Master Course Syllabus
School of Engineering and Computer Science
Washington State University Vancouver

CS 166

Discrete Mathematics

3 Semester Hours

(3 lecture hours)

Catalog Description

Introduction to the theoretical foundations of computing. Combinatorics, relations, trees, graphs, Boolean algebra, proof methods, and discrete probability as applied to computer science.

Prerequisite Courses

- CS 122 with a C or better or concurrent enrollment
- Math 171 with a C or better or concurrent enrollment or Math 172 with a C or better

Prerequisite Topics

- Algebraic operations and concepts
- Properties and applications of polynomial, exponential, and logarithmic functions
- Introductory programming skills

WSU Course Outcomes

Students taking this course will:

1. Use appropriate proof techniques to prove (or disprove) mathematical propositions. (WSU Goal 2)
2. Compute permutations and combinations of a set and interpret the results in particular application context. (WSU Goal 2)
3. Demonstrate basic principles of formal logics (propositional, predicate, Boolean) through their application. (WSU Goal 7)

Required Textbooks

- Rosen, Kenneth H., *Discrete Mathematics and Its Applications*, McGraw-Hill.

Reference Material

None

Major Topics Covered in the Course

1. Functions, relations and their properties
2. Sets, sequences and tuples
3. Discrete probability, counting (permutations and combinations)
4. Propositional logic and logical connectives
5. Boolean algebra
6. Introduction to predicate logic and its limitations

7. Formal proof strategies: counterexample, contraposition, contradiction, mathematical induction
8. Recursive computational definitions
9. Trees, graphs and traversal strategies

Projects

Programming Project Area	Weeks
(None)	

Design, Implementation and Analysis

Student assignments include many problems for which mathematical analysis is required. Specifically, during the portion of this course devoted to proof techniques, students are asked to construct proofs of various propositions using one of several techniques.

CS2013

This course provides coverage of CS2013 knowledge areas. Values listed are minimum course hours dedicated to the topic, percentages indicate the fraction of CS2013 knowledge area topics covered (acceptable values are: <25%, 25-75%, >75%, or 100%).

Area	Tier 1	Tier 2	Elective
DS/Sets, Relations, and Functions	6 (>75%)		N
DS/Basic Logic	8 (25-75%)		N
DS/Proof Techniques	8 (100%)		N
DS/Basics of Counting	4 (25-75%)		N
DS/Graphs and Trees	4 (25-75%)		N
DS/Discrete Probability	1 (<25%)		N

Course Coordinator:	Scott Wallace
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