

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

CS 216
Discrete Structures
3 Semester Hours

Catalog Description

Discrete mathematics, trees, graphs, elementary logic, and combinatorics with application to computer science.

Prerequisite Courses

Math 107 – Elementary Functions

Phil 201 – Elementary Logic

A programming course (such as CS 121, CS 251 or CS 253)

Prerequisite Topics

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

Measured Course Outcomes

Students taking this course will:

1. Select an appropriate proof technique and use it to prove (or disprove) mathematical propositions (*contributes to performance criterion A-2*)
2. Compute permutations and combinations of a set and interpret the results in particular application context (*contributes to performance criterion A-2*)
3. Demonstrate basic counting principles, such as the use of diagonalization or the pigeonhole principle (*contributes to performance criterion A-2*)

Required Textbooks

Discrete Mathematics and Its Applications, 5th edition by Kenneth H. Rosen, McGraw-Hill.

Reference Material

None specified.

Major Topics Covered in the Course

1. Functions, relations and their properties
2. Sets, sequences and tuples
3. Probability, counting (permutations and combinations)
4. Propositional logic and logical connectives
5. Introduction to predicate logic and its limitations
6. Formal proof strategies: counterexample, contraposition, contradiction, mathematical induction
7. Recursive mathematical definitions
8. Trees, graphs and traversal strategies

Laboratory Projects

No programming projects are specified for this course.

CSAB Category Content

	CORE	ADVANCED		CORE	ADVANCED
Data Structures	0	0	Computer Organization and Architecture	0	0
Algorithm & Software Design	0	0	Concepts of Programming Languages	0	0

Oral and Written Communications

There are no significant oral or written communications required in this course. Student solutions to assignments are almost exclusively written in mathematical notation.

Social and Ethical Issues

This course contains no significant coverage of social and ethical issues.

Theoretical Content

This course consists entirely of mathematical theory.

Topic	Hours
Sets, function and relation theory	6
Combinatorics	4
Basic logic theory	10
Proof techniques	12
Recurrence relations	4
Graph theory	5

Problem Analysis

Student assignments include many problems for which a mathematical analysis is required.

Solution Design

During the portion of this course devoted to proof techniques, students are asked to craft proofs of various propositions using one of several techniques.

CC2001

This course provides coverage of topics in the following areas (hours listed are minimums):

DS1. Functions, relations and sets [core]	6
DS2. Basic logic [core]	8
DS3. Proof techniques [core]	12
DS4. Basics of counting [core]	5
DS5. Graphs and trees [core]	4

Course Coordinator: Sarah Mocas
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