Salisbury University Department of Mathematical Sciences
MATH 210 : Introduction to Discrete Mathematics
Syllabus (Tentative)

Description: Introduction to basic techniques and modes of reasoning for discrete problem solving. Set theory, logic and proof, counting, graph theory, orderings, propositional calculus, and Boolean algebra. 4 Hours Credit: Meets four hours per week. Meets General Education IVB or IVC.

Prerequisites: C or better in MATH 140 or equivalent.

Intended Audience: Students interested in enhancing their reasoning and problem-solving skills. (Required for Mathematics and Computer Science Majors)

Objective: To introduce basic techniques of proof and reasoning, in particular, those for solving discrete problems. To enhance modes of thinking essential to mathematics. To teach techniques widely used in statistics, data science, and computer science.

Textbooks: *Discrete Mathematics: A Brief Introduction*, by Kathleen M. Shannon, 2nd edition; 2024 in WebAssign (also available in hard copy for those who would like a permanent hard copy in addition to the e-textbook, through Salisbury University's Bookstore, or as a pdf from your instructor). WebAssign is required for this course.

Topic	Weeks
Chapter 0: What is Discrete Mathematics? Introduction to Set Theory	2.0
Discrete vs. Continuous, Konigsburg problem, sets, subsets, set operations, set equality.	
Chapter 1: Functions and Relations	1.5
Functions and relations, equivalence relations, modular arithmetic, partial orderings, and Hasse Diagrams.	
Chapter 2: Logic and Proof	2.0
Introduction to proof, mathematical induction, strong induction, universal and existential quantifiers. (Optional Topic: Recurrence relations.)	
Chapter 3: Counting	3.5
Multiplication rule, ordered samples with and without repetition, principle of inclusion and exclusion. Party problem; unordered samples with repetition; planar graphs and isomorphisms.	
Chapter 4: Trees and Other Graphs	2
Graphs, multigraphs, networks, cycles, trees and spanning trees, greedy algorithms, and binary trees.	
Chapter 5: Propositional Calculus, Boolean Algebra and Digital Logic Gates	2
Set theory, propositional calculus, Boolean algebra, digital logic gates, using k-maps to simplify boolean expressions and circuits.	
Tests	1
Total	**14**

Evaluation

Homework, Quizzes, and Class Participation	30 { 40%
Tests and Final Exam	60 { 70%

- Free tutoring is available for this course in the Spring and Fall semesters.

- Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work.