SUNY OLD WESTBURY

DEPARTMENT OF MATHEMATICS AND COMPUTER & INFORMATION SCIENCE

DISCRETE MATHEMATICS   MA3030

Departmental Syllabus

TEXTBOOK: Discrete Mathematics: An Introduction to Mathematical Reasoning, 1 edition, by Susanna Epp, Cengage Learning;, 2011, ISBN: 9780495826170

Prerequisite: Grade of C or higher in Precalculus **MA2090**.

COURSE DESCRIPTION: An introduction to discrete mathematical structures. Topics include propositional and predicate logic, set theory, relations and functions, induction and recursion, algorithms and number theory, and graphs and trees.

COURSE OBJECTIVES: This course is designed to provide the mathematical foundations for upper level computer science and mathematics courses. Students should learn the essentials of discrete mathematical structures and how to think and reason mathematically. To accomplish these objectives, the course emphasizes mathematical reasoning and problem solving techniques. After successful completion of the course students should be able to communicate ideas mathematically and solve problems using the mathematical tools learned.

COURSE EVALUATION & GRADING: Your grade will be based on midterm exams, quizzes, class work, homework, and Final Exam. The Final exam is cumulative and it counts at least 30% of the course grade. The grading scale is as follows:

	B $^+$ = [87, 89]	**C $^+$** = [77, 79]	**D $^+$** = [67, 69]	
A = [94, 100] **A$^-$** = [90, 93]	**B** = [84, 86]	**C** = [74, 76]	**D** = [64, 66]	**F** = [0, 59]
	B $^-$ = [80, 83]	**C $^-$** = [70, 73]	**D $^-$** = [60, 63]	

TUTORIAL: Drop-in tutorial is available in the Mathematics Learning Center.

ACCOMMODATIONS FOR STUDENTS WITH SPECIAL NEEDS: If you have or suspect you may have a physical, psychological, medical or learning disability that may impact your course work, please contact Stacey DeFelice, Director, The Office of Services for Students with Disabilities (OSSD), NAB, 2065, Phone: 516-628-5666, Fax (516) 876-3005, TTD: (516) 876-3083. E-mail: defelices@oldwestbury.edu. The office will help you determine if you qualify for accommodations and assist you with the process of accessing them. All support services are free and all contacts with the OSSD are strictly confidential.

TOPICS TO BE COVERED

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THE LOGIC OF COMPOUND STATEMENTS
Introduction to Sets
Logical Form and Logical Equivalence
Conditional Statements
Valid and Invalid Arguments

THE LOGIC OF QUANTIFIED STATEMENTS
Predicates and Quantified Statements I
Predicates and Quantified Statements II
Statements with Multiple Quantifiers

ELEMENTARY NUMBER THEORY AND METHODS OF PROOF
Direct Proof and Counterexample I: Introduction
Direct Proof and Counterexample II: Rational Numbers
Direct Proof and Counterexample III: Divisibility
Direct Proof and Counterexample IV: Division into Cases and the Quotient-Remainder Theorem
Indirect Argument: Contradiction and Contraposition

SEQUENCES, MATHEMATICAL INDUCTION, AND RECURSION
Sequences
Mathematical Induction I
Mathematical Induction II
Defining Sequences Recursively
Solving Recurrence Relations by Iteration

SET THEORY
Set Theory: Definitions and the Element Method of Proof
Properties of Sets
Disproofs and Algebraic Proofs

FUNCTIONS
Functions Defined on General Sets
One-to-one, Onto, Inverse Functions
Composition of Functions

RELATIONS
Relations on Sets
Reflexivity, Symmetry, and Transitivity
Equivalence Relations

GRAPHS AND TREES
Graphs: An Introduction
Trails, Paths, and Circuits
 Matrix Representations of Graphs
Isomorphisms of Graphs
Trees: Examples and Basic Properties
Rooted Trees