

University College of the Cayman Islands

ASSOCIATE DEGREE SYLLABUS

COURSE NAME: DISCRETE MATHEMATICS

COURSE #: MAT 260

COURSE DESCRIPTION

The purpose of this course is to examine the branch of mathematics which embraces such topics as sets, sequences and functions, logic, relations induction and recursion, and methods of counting with particular applications in the field of computer science.

Credits: 3

Prerequisite: MA 105

COURSE OBJECTIVES

This course is intended to enable the student to:

1. Understand basic concepts relating to sets and functions.
2. Attain knowledge about relations, and counting techniques.
3. Become familiar with concepts of induction, recursion, graphs and trees.
4. Understand and apply logic.
5. Apply fundamentals of discrete mathematics at an adequate level in such areas as computer science.

ASSESSMENT

Coursework	-	40%
Mid-Semester Examination	-	20%
Final Examination	-	40%
Total		100%

REQUIRED TEXT

The following textbook(s) will be used for this course: 1. **Ross & Wright, *Discrete Mathematics***
3rd Edition

COURSE OUTLINE

I	SETS	Set Builder Notation Basic Set Operations Cardinality, Cross Products DeMorgans Law applied to Sets
II	LOGIC	Algebra of propositions Truth tables Tautologies and contradictions Logical equivalencies and implications DeMorgans Law applied to Logic
III	ARGUMENTS AND PROOFS	General Structure of Arguments via Truth Table Direct Proofs Proof by Contradiction/Contrapositive Proof by Induction
IV	FUNCTIONS AND RELATIONS	Cross Product and Relations Function Definition, Composite and Inver 1-1 and ONTO Modulation, Hash, Ceiling, Floor, Quotient Remainder Theorem Equivalence Relations Properties of Relations and Partitions Sequences, Series, Strings
V	MATRICES	Algebra of Matrices and Vectors Matrix Representations of Graphs and Relations
VI	ANALYSIS OF ALGORITHMS	Time and Space Complexity Big O Notations
VII	COMBINATORICS	Combinations Permutations Inclusion/Exclusion Principle Pigeon Hole Principle
VIII	RECURSION	Recursively called functions in Computer Science Solving 2 nd degree Recurrence Relations
IX	GRAPH THEORY	Euler Circuits and Hamiltonian Circuits Traveling Salesman Djikstras Algorithm Trees and Recursive Tree Traversals Kruskal Minimal Spanning Tree Planar Graphs Graph Isomorphisms