

Effective Fall 1993

DIVISION OF NATURAL SCIENCES AND MATHEMATICS

TIDEWATER COMMUNITY COLLEGE

VIRGINIA BEACH CAMPUS

COURSE PLAN

Course Number and Title: MATH 286 – Discrete Mathematics

Lecture Hours: 4 Lab Hours: 0 Credit Hours: 4

Submitted by: Iain McKaig, Elias Dabeet, Date: 6/25/93
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Approved by: B. Hubiak, C. Newsom Date 7/7/93
Program Coordinator(s)

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Division Chair

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 Dean of Academics

I. COURSE DESCRIPTION

Math 286 presents topics in discrete mathematical structures with an emphasis on applications to computer science. Topics include sets, Boolean algebra, logic, relations and functions, mathematical induction, counting techniques, recurrence equations, trees, and graphs.

II. PREREQUISITES

MTH 174 or the equivalent

III. INTRODUCTION

This course is designed to introduce students to topics in discrete mathematics that have applications to the fields of computer science and computer engineering.

IV. INSTRUCTIONAL MATERIALS

Textbook: Discrete Mathematics, by Kenneth P. Bogart; 1988; ISBN 0-669-08665-7; D.C. Heath and Company

V. BASIC CONCEPTS

The student must master the following concepts.

Chapter 1: Sets and Statements

- 1.1 Statements
- 1.2 Sets
- 1.3 Determining the Truth of Symbolic Statements
- 1.4 The Conditional Connectives
- 1.5 Boolean Algebra

Chapter 2: Symbolic Logic

- 2.1 Truth, Equivalence, and Implication
- 2.2 What is a Proof?
- 2.3 Predicate Logic

Chapter 3: Relations

- 3.1 Relations and Digraphs
- 3.2 Symmetric Relations
- 3.3 Equivalence Classes and Congruence Classes
- 3.4 Partial Orderings

Chapter 4: Functions

- 4.1 Functions and Sequences
- 4.2 Graphs and Operations on Functions
- 4.3 Growth Rates of Functions

Chapter 5: The Principle of Mathematical Induction

- 5.1 Proving Algebraic Statements by Induction
- 5.2 Other Applications of Induction
- 5.3 Applications of Induction in Computer Science

Chapter 6: Basic Counting techniques

- 6.1 Elementary Counting Techniques
- 6.2 Applications of the Basic Counting Principle
- 6.3 Counting Equivalence Classes
- 6.4 The Binomial Theorem and Pascal's Triangle
- 6.5 The Principle of Inclusion and Exclusion

Chapter 7: Recurrence Equations

- 7.1 First-Order Recurrences and Exponential Functions
- 7.2 First-Order Linear Recurrences
- 7.3 Second-Order Linear Recurrences

Chapter 8: Trees and Spanning Trees

- 8.1 Trees and Spanning Trees
- 8.2 Rooted Trees
- 8.3 Using rooted Trees in Computing
- 8.4 Minimizing Total Cost and Path Length in Spanning Trees

Chapter 9: Graphs

- 9.1 Basic Concepts of Graph Theory
- 9.2 Tours in Graphs
- 9.3 Coloring and Planarity
- 9.4 Digraphs and Machines

VI. SUGGESTED WEEKLY SCHEDULE – 16 WEEK SEMESTER

- Week 1: 1.1, 1.2, 1.3
- Week 2: 1.4, 1.5, 2.1
- Week 3: 2.2, 2.3, 3.1
- Week 4: 3.2, 3.3, 3.4
- Week 5: 4.1, 4.2
- Week 6: 4.3, 5.1
- Week 7: 5.2, 5.3
- Week 8: 6.1, 6.2
- Week 9: 6.3, 6.4
- Week 10: 6.5, 7.1
- Week 11: 7.2, 7.3
- Week 12: 8.1, 8.2
- Week 13: 8.3, 8.4
- Week 14: 9.1, 9.2
- Week 15: 9.3, 9.4
- Week 16: **Final Exam** to be given during scheduled exam period.

VIII. SUGGESTED WEEKLY SCHEDULE – 10 WEEK SEMESTER

- Week 1: 1.1, 1.2, 1.3, 1.4
- Week 2: 1.5, 2.1, 2.2, 2.3
- Week 3: 3.1, 3.2, 3.3, 3.4
- Week 4: 4.1, 4.2, 4.3, 5.1
- Week 5: 5.2, 5.3, 6.1
- Week 6: 6.2, 6.3, 6.4
- Week 7: 6.5, 7.1, 7.2
- Week 8: 7.3, 8.1, 8.2
- Week 9: 8.3, 8.4, 9.1
- Week 10: 9.1, 9.2, 9.3, **Final Exam**