

MATHEMATICS 332 DISCRETE STRUCTURES

I. Introduction

A. Catalog Description

This course studies the basic tools and techniques of discrete mathematics and their applications. It examines such algebraic structures as monoids, semigroups, groups, rings, boolean algebras, and finite-state machines; their morphisms and quotient structures. Applications include machine minimization and coding theory. *Prerequisite: Math 232.* Satisfies the proof-based requirement in major contracts.

B. Objectives

The principle objective of this course is to present those aspects of set theory, proof techniques, abstract algebra, and combinatorics that have frequent applications. The course is designed as an alternative to Abstract Algebra (Math 433) for students.

C. Prerequisites

Math 232.

II. Required Topics

A. Foundations

1. Set theory
2. Relations
3. Logical Inference
4. Mathematical Induction

B. Algebraic structures

1. Semigroups and monoids
2. Groups and quotient groups
3. Rings

C. Applications

1. Coding theory and group codes
2. Abstract machines

III. Bibliography

R.F. Lax, Modern Algebra and Discrete Structures

F. Preparata & R. Yeh, Introduction to Discrete Structures

C. Liu, Elements of Discrete Mathematics

H. Laufer, Discrete Mathematics and Applied Algebra

W. Gilbert, Modern Algebra With Applications

IV. Requirements

Written exams and homework exercises.