A: *Division:* **Instructional** *Date:* **May , 1997**

N: *Textbook and Materials to be Purchased by Students:*

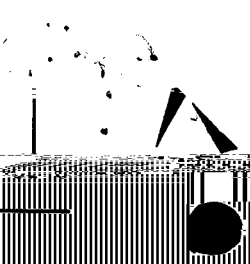
[redacted]

O: *Course Objectives:*

The student should be able to:

using propositional variables or functions, logical

- write english statements in symbolic form
- connectives and any necessary quantifiers;
- determine the truth value of a statement under an interpretation;
- determine the negation, converse or contrapositive of a statement;
- verify logical equivalencies;
- demonstrate an understanding of tautologies, contradictions and duals;
- prove the properties of logic;
- prove the propositio
- inality of sets, subsets, power sets and Cartesian products;
- determine the cardi
- combine sets using the set operators



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- give a recursive definition of a function or set;
- apply the inclusion-exclusion principle to solve counting problems for two tasks;
- solve counting problems using the Pigeon-Hole Principle;
- find the expansion of a binomial;

1. Logic

1.1. Propositions and truth tables.

1.2. Logical equivalences.

1.3. Predicates and quantifiers.

1.4. The laws of logic.

2. Set Theory

2.1. Cardinality.

2.2. Combining sets.

set theory.

2.4. The laws of

nd uncountable sets.

2.5. Countable a

3. Functions

3.1. Injective, surjective and bijective functions.

3.2. Composites and inverses.

3.4. Sequences and sums

rs and Matrices

4. Algorithms, Intege

to algorithms and their complexity.

4.2. Introduction to number theory.

4.3. Matrices.

Definitions

5. Mathematical Reasoning and Recursive D

5.1. Rules of inference

5.2. Deductive and Inductive proofs

5.3. Recursive Definitions

6. **Counting**

damental counting principles 6-1 Fun