C-ID Descriptor
Discrete Math

Descriptor Details

- **Descriptor Title**: Discrete Math
- **C-ID Number**: 160
- **Units**: 3.0
- **Date of Last Revision**: 10/12/2017 04:44:05 PM PDT

General Description

Fundamental topics for Computer Science, such as logic, proof techniques, sets, introduction to computer programming, basic counting rules, relations, functions and recursion, graphs and probability trees.

Prerequisites

College Algebra for STEM (C-ID Math 151) or Precalculus (C-ID Math 155) or Precalculus and Trigonometry (sequence course)

Corequisites

No information provided

Advisories

No information provided

Content

1. Formal logic including statements, symbolic representation, tautologies, propositional logic, quantifiers, predicates, and validity, predicate logic, and logic programming;

2. Proofs, recursion, and analysis of algorithms including proof techniques, proof by induction, proof of correctness programming, recursive definitions, recurrence relations, and analysis of algorithms;
3. Sets, combinatorics, probability, and number theory including counting, principle of inclusion and exclusion; Pigeonhole Principle, permutations and combinations, and Binomial Theorem;
4. Relations, functions, and matrices including relations and databases, modular arithmetic;
5. Graphs and trees including graphs and their representations, trees and their representations, decision trees, and Huffman Codes;
6. Graph algorithms including directed graphs and binary relations; Warshall's algorithm, Euler Path and Hamiltonian Circuit, shortest path and minimal spanning tree, traversal algorithms, and articulation points and computer networks;
7. Boolean Algebra and computer logic including Boolean algebra structure, logic networks, and minimization; and
8. Modeling arithmetic, computation, and languages including algebraic structures, finite-state machines, and formal languages.

Lab Activities

No information provided

Objectives

Upon successful completion of the course, students will be able to:

1. Use recursion to analyze algorithms and programs;
2. Write proofs using symbolic logic and Boolean Algebra;
3. Use sets to solve problems in combinatorics and probability theory;
4. Apply matrices to analyze graphs and trees; and
5. Use finite state machines to model computer operations.

Evaluation Methods

Tests, examinations, homework or projects where students demonstrate their mastery of the learning objectives and their ability to devise, organize and present complete solutions to problems.

Textbooks

A college level textbook supporting the learning objectives of this course.