CUMBERLAND COUNTY COLLEGE

Course: MA 111 Discrete Mathematics

Credits: 4

Prerequisites: MA 110 or permission from the instructor.

Description

Discrete Mathematics is designed to meet the needs not only of students majoring in computer science but of wider audience, especially students in mathematics and science. The course provides tools for formal reasoning as well as providing an early look at the connections between mathematics and computer science and the applications they generate. Topics include counting rules, prepositional and first-order logic, set theory, functions (with an emphasis on recursive functions), basic equivalence relations, algorithms, proofs, graphs and trees. An introduction to Boolean algebra and switching circuits is included.

Learning Outcomes

At the completion of this course, students will be able to:

- Develop logic and problem solving skills through exposure to and constructing many different forms of proof and/or arguments;
- Develop an understanding of sets, relations, and functions;
- Develop, perform and/or investigate an algorithm;
- Develop strong computational skills for typical counting problems;
- Evaluate and find the closed form for simple recurrence relations;
- Develop an understanding of graph theory;
- Develop an understanding of trees and their connection with search or sorting algorithms;
- Develop an understanding of Boolean Algebra and Combinatorial Circuits.

Topical Outline:

- Prepositional + Predicate Logic
- Mathematical systems, proof and induction
- Sets, Sequences, Strings, Number Systems, Relations
- Equivalence Relations, Functions, Intro to Algorithms
- Notation for Algorithms and an example (Euclidean)
- Recursive Algorithms and Intro to Complexity
- Basic Counting methods and Mult / Add principles
- Binomial Coefficients and the pigeonhole principle
- Recurrence Relations
- Solving Rec. Rel., Analy of Algor by Worse/Average Case
- Basic Graph theory, cycles and paths
- Intro to Tree terminology and spanning trees
- Binary Trees, Decision trees Boolean Algebra, Combinatorial Circuits
- Synthesis of circuits, minimization problem and apps

Required Texts and Other Materials

Discrete Mathematics With Applications by Susanna Epp, 3rd ed., Cengage, ISBN: 9780534359454

Student Assessment

Assessment may be accomplished through projects, portfolios, online assignments, exams, presentations and/or papers.

Academic Integrity

Plagiarism is cheating. Plagiarism is presenting in written work, in public speaking, and in oral reports the ideas or exact words of someone else without proper documentation. Whether the act of plagiarism is deliberate or accidental [ignorance of the proper rules for handling material is no excuse], plagiarism is, indeed, a "criminal" offense. As such, a plagiarized paper or report automatically receives a grade of ZERO and the student may receive a grade of F for the semester at the discretion of the instructor.

Available Resources

If you are having difficulty with work in this class, tutoring is available through the Success Center. If you think that you might have a learning disability, contact Project Assist at 856.691.8600, x1282 for information on assistance that can be provided to eligible students.

(List availability of open labs and/or writing center)

Before Withdrawing From This Course

If a student experiences adverse circumstances while enrolled in this course and considers withdrawing, s/he should see an advisor (division or advisement center) BEFORE withdrawing from the class. A withdrawal may cause harmful repercussions to completion rate standards and overall GPA which can limit or eliminate future financial aid in addition to causing academic suspension.