

**COLLIN COUNTY COMMUNITY COLLEGE DISTRICT
COURSE SYLLABUS**

COURSE NUMBER: Math 2305

COURSE TITLE: Discrete Math I

CREDIT HOURS: 3 **LECTURE HOURS:** 3 **LAB HOURS:** 1 **CLN/REC HRS:** 0

PREREQUISITE: Math 1376, Math 2413 or Math 2417

COREQUISITE: None

TEXTBOOK:

Discrete Mathematics and Its Applications 6th ed. Kenneth H. Rosen, ©2007 McGraw Hill

SUPPLIES: Graphing calculator required

COURSE DESCRIPTION:

Introduction to mathematical logic and algorithms. Graph theory, combinatorics, and applications to computer science. Lab required.

COURSE MEASURABLE LEARNING OBJECTIVES:

Upon completion of this course the students should be able to do the following:

1. Construct valid mathematical arguments using logical connectives and quantifiers.
2. Verify the correctness of a mathematical argument using symbolic logic and truth tables.
3. Solve problems using counting techniques and combinatorics.
4. Construct a proof using direct proof, proof by contradiction, and proof by cases, or mathematical induction.
5. Perform operations on discrete structures such as sets, discrete functions, relations, sequences, and matrices.
6. Solve problems involving recurrence relations and generating functions.
7. Analyze algorithms, determine algorithmic complexity, and apply algorithms to solve problems from number theory.

COURSE REQUIREMENTS:

Completion of required exams and assignments.

COURSE FORMAT:

Lecture, lab and guided practice.

METHOD OF EVALUATION:

A minimum of four written exams, a lab component grade, and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor's addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student's grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

ATTENDANCE POLICY:

Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to contact the instructor to obtain assignments. Please see the schedule of classes for the last day to withdraw.

Religious Holy Days: In accordance with section 51.911 of the Texas Education Code, the college will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time. A copy of the state rules and procedures regarding holy days and the form for notification of absence from each class under this provision are available from the Admissions and Records Office.

COURSE REPEAT POLICY:

All students may repeat this course only once after receiving a grade, including W. For example students who have taken this course twice have to choose a different course to take after two trials.

ADA STATEMENT:

It is the policy of Collin County Community College to provide reasonable and appropriate accommodations for individuals with documented disabilities. This College will adhere to all applicable Federal and State laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student's responsibility to contact the ACCESS Office (G-200) or 972.881.5898, (TDD 972.881.5950) in a timely manner if he/she desires to arrange for accommodations.

ACADEMIC ETHICS:

The college may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of material as one's own work that is not one's own. Scholastic dishonesty may involve one or more of the following acts: cheating, plagiarism, collusion, and/or falsifying academic records.

Cheating is the willful giving or receiving of information in an unauthorized manner during an examination, illicitly obtaining examination questions in advance, using someone else's work for assignments as if it were one's own, copying computer disks or files, and any other dishonest means of attempting to fulfill the requirements of a course.

Plagiarism is the use of an author's words or ideas as if they were one's own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation. Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures or consult the CCCCD Student Handbook.

COURSE CONTENT:

MODULE 1: Foundations of Logic and Proofs, Sets, and Functions

The students will learn about:

1. Logic
2. Propositional Equivalences
3. Predicates and Quantifiers
4. Nested Quantifiers
5. Methods of Proof
6. Sets and Set operations
7. Functions

MODULE 2: Fundamentals of Algorithms, The integers, and Matrices

The students will learn about:

1. Algorithms
2. The Growth of Functions
3. Complexity of Algorithms
4. The integers and Division
5. Applications of number theory
6. Matrices

MODULE 3: Mathematical Reasoning, Induction and Recursion

The students will learn about:

1. Proof Strategy
2. Sequences and Summations
3. Mathematical Induction
4. Recursive Definitions and structural Induction
5. Recursive Algorithm

MODULE 4: Fundamentals of Counting

The students will learn about:

1. The basics of Counting
2. The Pigeonhole Principle
3. Permutations and Combinations
4. Binomial Coefficients
5. Generalized Permutations and Combinations Rules of Sum and Product
6. Generating Permutations and Combinations

MODULE 5: Advanced Counting Techniques

The students will learn about:

1. Recurrence Relations
2. Solving Recurrence Relations
3. Generating Functions
4. Inclusion and Exclusion

MODULE 6: Relations

The students will learn about:

1. Relations and Their Properties
2. n-array Relations
3. Representing Relations
4. Closure of Relations
5. Partial Orders (Hasse Diagram)