

MATH 125

Finite Mathematics and Modeling

3 Credits

Community College of Baltimore County
Common Course Outline

Description

MATH 125 – Finite Mathematics and Modeling: is a course that explores applications mathematics to business, management, science, health, and social sciences. The course covers linear functions, linear systems, matrices, probability, linear programming, mathematical models, simple and compound interest, annuities, amortization, descriptive statistics, logic, and other selected topics.

Pre-requisites: MATH 082 or sufficient math placement score; and ACLT 053 or (ESOL 052 and ESOL 054)

Overall Course Objectives

Upon completion of this course, students will be able to:

1. assess studies for their experimental design and ethical considerations;
2. evaluate the validity of a logical argument using truth tables;
3. generate the symbolic form of various logical statements;
4. perform operations on matrices, including multiplication and inversion;
5. construct a system of equations from a verbal description;
6. solve systems of equations using matrices;
7. graph the solution set for two or more linear inequalities in two variables;
8. optimize an objective function with constraints for a linear programming problem from everyday life using the graphical and simplex methods;
9. formulate informed decisions based on mathematical models for real world financial mathematics, including compound interest, annuities, and amortization;
10. use appropriate technology to solve mathematical problems;
11. determine the number of possible outcomes for a given application using the fundamental counting principle, permutations, and combination;
12. apply the definitions of dependent and independent events, mutually exclusive events, sample space, and probability to solve problems involving chance;
13. calculate expected values and probabilities using the addition rule, product rule, and complement rule;
14. describe, numerically and graphically, various forms and presentations of statistical data;
15. examine the mathematical contributions made by people from diverse cultures throughout history, and their social, and cultural significance;
16. evaluate cultural and social applications and approaches to statistical reasoning;
17. find, evaluate, use, and cite academic resources for conducting research in mathematics; and

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18. communicate mathematical concepts using appropriate terms.

Major Topics

- I. Matrices
 - a. Terminology and basic operations
 - b. Inverse matrices
 - c. Gauss-Jordan method
 - d. Gaussian elimination method
- II. Linear Programming
 - a. Forms of linear equations
 - b. Graphs of systems of linear inequalities
 - c. Corner point theorem
 - d. Solving linear programming problems using the graphical method
 - e. Solving linear programming problems using the simplex method
 - f. Linear programming models
- III. Mathematics of Finance
 - a. Simple and compound interest
 - b. Annuities
 - c. Amortization
 - d. Exploration of global and ethical topics through applications of financial equations
 - e. Loans
- IV. Counting and Probability
 - a. Combinations and permutations
 - b. Terminology and basic concepts of probability
 - c. Dependent, independent, and mutually exclusive events
 - d. Applications of counting methods and probability theory
- V. Elementary Statistics
 - a. Experiments and ethics
 - b. Frequency distributions
 - c. Statistical displays of data
 - d. Measures of center
 - e. Boxplots
 - f. Analyzing and interpreting statistics in a global community
- VI. Logic
 - a. Symbolic logic
 - b. Truth tables
 - c. Logical arguments

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- two exams, 60% application based (this may include the final exam)
- a final exam, not necessarily cumulative
- a project worth a minimum of 10% of the overall course grade that will allow students to demonstrate at least 5 of the 7 General Education Program outcomes

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- 50% of overall course grade must be derived from proctored assignments.

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

This course is an approved 3–credit General Education course in Mathematics. One or more assignments will infuse CCBC General Education Program outcomes and will account for a minimum of 10% of the total course grade. The assignment(s) will allow students to demonstrate at least 5 of the 7 General Education program outcomes.

Date Revised: 11/7/2023

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