NetMath

DEPARTMENT OF MATHEMATICS

Math 124: Finite Mathematics (3 credit hours)

Course Description

This course is suitable for business and social science students. Topics for this course include operations on sets, counting principles, permutations and combinations, linear equations, mathematical probability, matrices, mathematics of finance and some hands on probability distributions such as normal and exponential distributions.

Prerequisite: College Algebra

Course Objectives

After completing this course a successful student will be able to understand and apply the topics listed above. More precisely at the end of this course the students should be able to:

- o Work with problems in business and social science to devise the mathematical modeling for some real world problems.
- o Utilize numerical approach to analyze mathematical problems graphically.
- o Do quantitative analysis of discrete data sets
- o Solve the system of linear equations using different matrix methods

Course Content and Format

Content

A brief outline of topics for this course appears below:

- Sets
    - o Set operations
    - o Inclusion-Exclusion principle
    - o De Morgan's Law
    - o Cartesian Product
- Counting Principles
    - o Fundamental principle of counting
    - o Basic Multiplication Principle of Counting
    - o Basic summation Principle of Counting.

- Permutations and Combinations
    - o Permutations

- o Combinations
- o Multinomial coefficients

- Probability Theory
  - o Frequency Plots
  - o Expected Value, Variance
  - o Cumulative Distribution Plots and Histograms
  - o Probability calculation for independent/dependent sets
  - o Conditional probability

- Normal and Exponential Distributions
  - o Gaussian/Normal distribution, mean, variance
  - o Relationship between bell shape and cumulative distribution
  - o Exponential distribution
  - o Memoryless property of exponential distribution

- Matrices
  - o Matrices types
  - o Matrix operations such as multiplication, addition, inverse
  - o Gauss-Jordan Elimination
  - o Matrix Identities
  - o Solution of linear system of equations using matrix method
  - o Matrix pivoting

Math 124 utilizes the CAS-ILE system. *See https://cas-ile.illinois.edu/ for more information.* This online system helps students learn math topics through dynamic exploration and visualization.

Exams for Math 124 are taken online.