

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY MTH 165 – FINITE MATH (3 CR.)

Course Description

Presents topics in systems of equations, matrices, linear programming, mathematics of finance, counting theory, probability, and Markov Chains. Emphasis is placed on the development of mathematical skills that are then applied to business applications and models.

General Course Purpose

The general purpose is to expose students to the use of mathematics as a tool (applications and mathematical modeling), as well as developing problem solving and critical thinking abilities.

Course Prerequisites/Corequisites

Prerequisite: MTE 1-9 or placement.

Course Objectives

- Systems of Equations
 - Set-up and solve business applications modeled by systems of equations by various methods.
 - Find inverse matrices, row reduced matrices and perform matrix operations. For 3x3 matrices or larger, a graphing calculator may be used to find inverses.
 - Write matrix equations and use them to solve "Input-Output" problems from economics (Leontief Models) with the calculator.
- Finance
 - Explain the differences between the formulas for simple, compound, and continuous interest related to investments, annuities, and loans, with an emphasis on the role and appropriate use of exponential growth and summation.
 - Investigate loan and investment options and utilize the appropriate formulas to solve a variety of problems.
- Linear Programming
 - Solve simple linear programming problems applying the geometric method.
 - Solve standard maximization and minimization linear programming problems by the Simplex Method.
 - Model business case studies applying linear program concepts and applying appropriate methods to draw conclusions and make recommendations.
- Probability
 - Use simple counting methods: multiplicative, additive principle, permutations and combinations to answer counting theory questions.
 - Form and solve probability problems with "and" and "or", intersection and union.
 - Identify and solve conditional probability problems with probability trees and use them with Bayes' Theorem to solve applied problems in business.
 - Form probability distributions for simple random variables and use mathematical expectation to solve decision analysis problems from sentence descriptions.
- Markov Chains
 - Construct "transition" matrices to describe a stochastic process and use them to solve problems about states after transition periods.
 - Find "steady state" or long-range predictions for regular transition matrices and applications (use the powers of matrices on the calculator to find).
- Application
 - Complete a semester project demonstrating broad knowledge of course content and applying appropriate technology in project development. (Instructors see pedagogical notes in course docs.)

Major Topics to be Included

- a) Systems of Equations
- b) Finance
- c) Linear Programming
- d) Probability
- e) Markov Chains
- f) Applications