



Finite Mathematics: University of Alabama

(For a list of materials used in the course, please see http://www.thencat.org/R2R/AcadPrac/CM/UA_FinMath_Mat.pdf.)

Finite Mathematics is a one-semester, three-credit course that covers the following topics:

Linear Functions

- Slopes and Equations of Lines
- Linear Functions and applications
- The Least Squares Line
- Extended Application: Using Extrapolation to Predict Life Expectancy

Systems of Linear Equations and Matrices

- Solution of Linear Systems by the Echelon Method
- Solution of Linear Systems by the Gauss-Jordan Method
- Addition and Subtraction of Matrices
- Multiplication of Matrices
- Matrix Inverses
- Input-Output Models
- Extended Application: Contagion

Linear Programming: The Graphical Method

- Graphing Linear Inequalities
- Solving Linear Programming problems Graphically
- Applications of Linear Programming

Linear Programming: The Simplex Method

- Slack Variables and the Pivot
- Maximization Problems
- Minimization Problems; Duality
- Nonstandard Problems
- Extended Application: Using Integer Programming in the Stock-Cutting Problem

Mathematics of Finance

- Simple and Compound Interest
- Future Value of an Annuity
- Present Value of an Annuity; Amortization
- A Strategy for Solving Finance Problems
- Extended Application: Time, Money, and Polynomials

Logic

- Statements and Quantifiers
- Truth Tables and Equivalent Statements
- The Conditional and Circuits
- More on the Conditional
- Analyzing Arguments with Euler Diagrams
- Analyzing Arguments with Truth Tables
- Extended Application: Logic Puzzles

Sets and Probability

- Sets
- Applications of Venn Diagrams
- Introduction to Probability
- Basic Concepts of probability
- Conditional Probability; Independent Events
- Bayes' theorem
- Probability Summary
- Extended Application: Medical Diagnosis

Counting Principles; Further Probability Topics

- The Multiplication Principle; Permutations
- Combinations
- Probability applications of Counting principles
- Binomial Probability
- Probability distributions; Expected Value
- Extended Application: Optimal Inventory for a Service Truck

Statistics

- Frequency Distributions; Measures of Central Tendency
- Measures of Variation
- The Normal Distribution
- Normal Approximation to the Binomial Distribution
- Extended Application: Statistics in the Law – The Castaneda Decision

Markov Chains

- Basic Properties of Markov Chains
- Regular Markov Chains
- Absorbing Markov Chains
- Extended Application: A Markov Chain Model for Teacher Retention

Game Theory

- Strictly Determined Games
- Mixed Strategies
- Game Theory and Linear Programming
- Extended Application: The Prisoner's Dilemma – Non-Zero Sum Games in Economics