# MATH A155: FINITE MATHEMATICS WITH APPLICATIONS

| Item | Value |
|---|---|
| Curriculum Committee Approval Date | 03/20/2024 |
| Top Code | 170100 - Mathematics, General |
| Units | 4 Total Units |
| Hours | 72 Total Hours (Lecture Hours 72) |
| Total Outside of Class Hours | 0 |
| Course Credit Status | Credit: Degree Applicable (D) |
| Material Fee | No |
| Basic Skills | Not Basic Skills (N) |
| Repeatable | No |
| Grading Policy | Standard Letter (S),<br>• Pass/No Pass (B) |
| Associate Arts Local General Education (GE) | • OC Comm/Analytical Thinking - AA (OA2) |
| Associate Science Local General Education (GE) | • OCC Comm/AnalyticalThinking-AS (OAS2)<br>• OCC Mathematics (OMTH) |
| California General Education Transfer Curriculum (Cal-GETC) | • Cal-GETC 2A Math Concepts (2A) |
| Intersegmental General Education Transfer Curriculum (IGETC) | • IGETC 2A Math Concepts (2A) |
| California State University General Education Breadth (CSU GE-Breadth) | • CSU B4 Math/Quant.Reasoning (B4) |

## Course Description

Functions including linear, exponential, and logarithmic; systems of linear equations and matrices; systems of linear inequalities and linear programming; mathematics of finance; set theory including sets and Venn diagrams; and probability and combinatorics. PREREQUISITE: MATH A030 or higher or appropriate placement. Transfer Credit: CSU; UC.

## Course Level Student Learning Outcome(s)

1. Set up and solve linear programming problems and interpret the result.
2. Perform calculations in mathematics of finance problems.
3. Apply basic combinatorial principles to solve counting problems.
4. Apply linear function to economics.

## Course Objectives

- 1. Use linear, exponential, and logarithmic graphs and functions to solve applied problems
- 2. Write a system of linear equations to solve applied problems
- 3. Solve a system of linear equations using Gauss-Jordan elimination and interpret the result
- 4. Find the inverse of a square matrix
- 5. Use the inverse of a square matrix to solve a system of linear equations/matrix equation of the form Ax = B
- 6. Solve linear programming problems in at least three variables
- 7. Solve applied problems in finance including simple and compound interest, future and present value, annuities, sinking funds, and amortization
- 8. Find unions, intersections, and complements of sets
- 9. Use Venn diagrams to solve problems in set theory
- 10. Use basic combinatorial principles to solve counting problems
- 11. Determine the probability of a specified event
- 12. Determine the conditional probability of an event

## Lecture Content

It is imperative that instructors cover all topics in the outline in order to prepare the students for M140. The instructor may determine the order of topics. The department encourages the instructor to incorporate the graphing calculator wherever it is appropriate. Linear equations and their graphs Linear equations and inequalities Graphs and lines Linear Regression Applications Functions and their graphs Functions and function notation Applications of linear functions to economics Cost, revenue, and profit functions Supply and demand equations Break-even point Free market equilibrium Exponential functions and their applications Logarithmic functions and their applications Systems of linear equations including systems in two and three variables Solving by using Gauss-Jordan Method/Gauss-Jordan Elimination Applications Matrices Matrix algebra Perform matrix operations: addition, subtraction, and multiplication Perform elementary row operations Inverse matrices Matrix equations and their solutions: Ax = B Gauss-Jordan elimination Reduced row-echelon form Applications Linear inequalities and linear programming Linear inequalities Linear inequalities in two variables Systems of linear inequalities in two variables Geometrical solutions Applications Linear programming Simplex Method: Maximization with problem constraints of the form . Duality/The Dual Problem: Minimization with problem constraints of the form . Non-standard probl ems/maximalization and minimization problems with mixed problem constraints Mathematics of finance Simple interest Compound interest and continuous compound interest Annuities Future value including lump sums and annuities Present value including lump sums and annuities Sinking funds Amortization Set theory Definitions including subset and proper subset Set operations: union, intersection, and complement DeMorgans Laws Venn diagrams and their applications Probability and combinatorics Probability Sample spaces Events including mutually exclusive and independent Complement of an event Basic probabilities and probability rules Tree diagrams Calculating probabilities including probability of an event given the probabilities of the simple events in a sample space Calculating probabilities including probability of an event given the probabilities of the simple events in a sample space Applications Combinatorics Basic counting principles including the Fundamental Counting Rule Permutations Combinations Applications

## Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)

## Instructional Techniques

Lecture, written homework, discussion.

## Reading Assignments
Assigned from textbook. 1 hour

## Writing Assignments
Tests include writing definitions, describing modeling situations, and criticizing modeling situations. 1 hour

## Out-of-class Assignments
Assigned problem solving exercises. 6 hours

## Demonstration of Critical Thinking
Apply mathematical thinking and modeling to solve problems.

## Required Writing, Problem Solving, Skills Demonstration
Tests include writing definitions, describing modeling situations, and criticizing modeling situations.

## Eligible Disciplines
Mathematics: Masters degree in mathematics or applied mathematics OR bachelors degree in either of the above AND masters degree in statistics, physics, or mathematics education OR the equivalent. Masters degree required.

## Textbooks Resources
1. Required Barnett, R.A., Ziegler, M.R., Byleen, K.E., Stocker, C.J.. Finite Mathematics for Business, Economics, Life Sciences, and Social Sciences, 14th ed. Boston, MA: Pearson, 2019 Rationale: Updating the textbook to reflect what is being use in the class.

## Other Resources
1. Other appropriate textbooks as chosen by faculty.