# BUTTE COLLEGE
## COURSE OUTLINE

I. **CATALOG DESCRIPTION**

**MATH 12 - Mathematics for Business Decisions (Finite Mathematics)**        **3 Unit(s)**

**Prerequisite(s):** MATH 124 or Math Level V
**Recommended Prep:** Reading Level IV

**Transfer Status:** CSU/UC

51 hours Lecture

Linear functions, systems of linear equations and inequalities, matrices, linear programming, mathematics of finance, sets and Venn diagrams, combinatorial techniques and an introduction to probability. Applications in business, economics and social sciences. (C-ID MATH 130).

II. **OBJECTIVES**

Upon successful completion of this course, the student will be able to:
   A. Apply linear and exponential graphs and functions.
   B. Write a system of linear equations to solve applied problems.
   C. Solve a system of linear equations using Gauss-Jordan elimination and interpret the result.
   D. Find the inverse of a square matrix and use the inverse to solve a system of linear equations.
   E. Solve linear programming problems in at least three variables.
   F. Find unions, intersections and complements of sets and use Venn diagrams to solve problems.
   G. Apply basic combinatorial principles to enumeration problems.
   H. Determine the probability of a specified event.
   I. Find the conditional probability of an event.
   J. Solve applied problems in finance including simple and compound interest, future and present value, annuities, sinking funds, and amortization.

III. **COURSE CONTENT**
   A. **Unit Titles/Suggested Time Schedule**

<div align="center">Lecture</div>

| Topics | Hours |
|---|---|
| 1. Linear equations and functions | 2.00 |
| 2. Exponential and logarithmic functions and their applications | 3.00 |
| 3. Applications of linear functions to economics such as cost, revenue and profit functions, supply and demand equations, break-even point, and free market equilibrium | 8.00 |
| 4. Systems of linear equations | 3.00 |
| 5. Matrices including matrix algebra, Gauss-Jordan elimination and reduced-row echelon form, inverse matrices, and applications | 8.00 |
| 6. Linear programming | 8.00 |
| 7. Math of finance including simple and compound interest, future and present value, annuities, sinking funds, and amortization | 8.00 |
| 8. Set theory including DeMorgan's Laws and Venn diagrams | 3.00 |
| 9. Probability and combinatorics including permutations and combinations; finding the probability of an event given the probabilities of the simple events in a sample space; conditional probability | 8.00 |
| Total Hours | 51.00 |

IV. **METHODS OF INSTRUCTION**
    A. Lecture
    B. Collaborative Group Work
    C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
    D. Discussion
    E. Board Work

V. **METHODS OF EVALUATION**
    A. Exams/Tests
    B. Quizzes
    C. Class Assignments and Class Response
    D. Daily Homework Assignments, where the student will demonstrate problem-solving skills

VI. **EXAMPLES OF ASSIGNMENTS**
    A. Reading Assignments
        1. Read the section in the textbook on Solution of Linear System by the Gauss-Jordan Method and be able to use it to solve a system of linear equations.
        2. Read the section in the textbook on Sets and be able to demonstrate the operations on a set using a Venn diagram.
    B. Writing Assignments
        1. Explain in words how to set up a system of equations to use the Gauss-Jordan Method and the process involved when using this method.
        2. Describe in words how to interpret complement, intersection, and union of sets. Use Venn diagrams in your explanation and assume you are explaining it to someone in the class who is having trouble.
    C. Out-of-Class Assignments
        1. Review the section in the textbook on Solution of Linear System by the Gauss-Jordan Method and solve the problems assigned by the instructor, showing all work.
        2. Review the section in the textbook on Counting Elements in a Subset Using a Venn Diagram and solve the problems assigned by the instructor, showing all work.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**
    Textbooks:
    A. Rolf, H.L. Finite Mathematics. 7th Edition. Thomson Brooks/Cole, 2007.

    Materials Other Than Textbooks:
    A. Graphing calculator without symbolic algebra capabilities

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