MATH A100: LIBERAL ARTS MATHEMATICS

Item	Value
Curriculum Committee Approval Date	03/20/2024
Top Code	170100 - Mathematics, General
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Associate Arts Local General Education (GE)	• Area 1B Communication and Analytical Thinking (OA2)
Associate Science Local General Education (GE)	• Area 1B Communication and Analytical Thinking (OAS2) • Area 2 Mathematical Concepts and Quantitative Reasoning (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

This is a survey course designed for non-science majors. Topics include mathematics of finance, probability, statistics, set theory, voting methods, and other selected topics such as logic, geometry, and graph theory. PREREQUISITE: MATH A030 or higher or appropriate placement. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Determine the winner of an election using the Plurality Method, Borda Count Method, Plurality-with-Elimination Method, or Pairwise Comparison Method.
2. Use Venn diagrams to represent sets and draw conclusion about the represented sets.
3. Calculate the principal, future value, or interest earned on a simple or compound interest investment.
4. Organize statistical data in a meaningful way to draw appropriate conclusions.
5. Calculate the probability of a simple or compound event.

Course Objectives

- 1. Apply set theory concepts to problem solving.
- 2. Use mathematical formulas to solve problems in practical applications such as borrowing money and saving money.
- 3. Apply statistical methods to analyze data.
- 4. Construct a tree diagram to represent a sample space and determine the corresponding probabilities.
- 5. Use an apportionment model to verify current apportionment numbers in the House of Representatives.

Lecture Content

Each of these topics is presented with a view toward its mathematical structure and the application of that structure to the solution of contemporary realistic problems from a wide variety of disciplines. Set Theory Definitions including subset, proper subset, and cardinality Set operations including union, intersection, difference, and complement DeMorgan s Laws Venn diagrams and their applications Consumer Math/ Mathematics of Finance Percents Simple interest Compound interest Installment buying Student loans Home buying including amortization Investing in stock and bonds (optional) Statistics Organizing and picturing data including frequency distributions, stem-and-leaf plots, bar graphs, and histograms Measures of average: mean, median, and mode Measures of variation: range, standard deviation, and variance Measures of position: percentiles, quartiles, boxplots, and outliers The Normal Distribution including The Empirical Rule (68-95-99.7 Rule) Probability and Counting Techniques Basic concepts of probability including events, sample spaces, "and" probabilities, "or" probabilities The Fundamental Counting Principle Permutations Combinations Determining sample spaces by using tree diagrams and tables Probability invovling permutations and combinations (optional) Odds and expected value (optional) Conditional probabilities (optional) Voting Methods Preference Tables Pluraity Method The Borda Count Method Plurality-with-Elimination Method The Pairwvise Comparision Method Approval Voting Apportionment Introduction to standard divisors and quotas Apportionment models Hamilton's Method Jefferson's Method Adams' Method Webster's Method Huntington-Hill Method Instructor must choose at lease one of the following three topics (i.e., Logic, Graph Theory, Geometry), and, time permitting, may choose to teach more than one topic: Logic Statements Simple Negation Compound: conjuntion, disjunction, coditional (including converse, inverse, and contrapositive), biconditional Symbolic form and notation Analysis of valid and invalid arguments, which may include: Determining validity of arguments (e.g., using truth tables) Drawing a valid conclusion from a given set of premises Classic syllogisms and fallacies (e.g., Transitive Reasoning/ Law of Syllogism, Affirming the Conclusion/Fallacy of the Converse) Graph Theory Definitions including graph, vertices, edges, equivalent graphs, degree, loop, bridge, path, and circuit Euler's paths and Euler circuits Euler's Theorem and Fleury's Algorithm Hamilton paths and circuits Traveling Salesperson problem Brute Force Method Nearest Neighbor Method Cheapest Link Algorithm Geometry Angles and lines Polygons Circles Three-dimensional figures Geometric measurements (e.g., permiter, area, surface area, volume, length of the sides of a right triangle using the Pythagorean Theorem) If time permits, instructor may elect to cover any of the topics in areas II and IV identified as optional. Instructor m ay also elect to cover any topics selected from areas of student interest or instructor expertise that are not listed here.

Method(s) of Instruction

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

Instructional Techniques

Although the primary instructional mode is the lecture/demonstration method emphasizing approaches to problem solving, significant class time is reserved for student questions and class discussion. Lectures are enhanced by video, film, audio, and slide presentations.

Reading Assignments

Students will spend approximately 1-2 hours per week on readings as assigned from textbook selection

Writing Assignments

Writing is required on homework assignments and quizzes (hours included in out-of-class calculation)

Out-of-class Assignments

Writing is required on homework assignments and quizzes; however, the applications nature of the course requires proficiency demonstration of problem-solving skills. (Approximately 4-5 hours per week)

Demonstration of Critical Thinking

Grades are determined by student performance on unit tests which evaluate problem-solving techniques and understanding of appropriate specialized vocabulary; a comprehensive final exam whose structure is similar to that of the unit test; written homework assignments involving problem solving, diagram sketching, and written explanation and/or analysis; and quizzes on which detailed work is demonstrated.

Required Writing, Problem Solving, Skills Demonstration

Writing is required on homework assignments and quizzes

Textbooks Resources

1. Required Sobecki, D.. Math in Our World, 5th ed. New York, NY: MacGraw-Hill Education, 2023 Rationale: -

Other Resources

1. Other appropriate textbooks as chosen by faculty.