MATH C100: LIBERAL ARTS MATHEMATICS

Item	Value
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)
Local General Education (GE)	• Area 2 Mathematical Concepts and Quantitative Reasoning (CA3)
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

Examines the mathematics involved in personal finance, environmental issues, the social sciences, politics and voting, business and economics, graph theory, fractals, art, and music. The course will also include a writing and research component. PREREQUISITE: A course taught at the level of intermediate algebra or appropriate math placement. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Apply mathematics and quantitative reasoning to management of personal finance including credit card debt, loans, savings plans, mortgages, investments, and taxes.
2. Model and predict real-world quantities that are increasing and decreasing using percentages, linear and exponential growth and decay, logarithmic and logistic functions, doubling time and half-life.
3. Calculate dimensions of natural objects using fractal geometry.
4. Describe the connection between mathematics and politics including methods of voting, preference schedules, and how congressional district maps, boundaries and gerrymandering can determine the outcome of an election.

Course Objectives

- 1. Correctly solve problems involving unit analysis; calculate payments and amounts owed involving personal finance such as mortgage payments, credit card debt, interest charges, and income taxes; interpret the many different uses and abuses of percentages in the media.
- 2. Correctly solve the real-world applications such as population growth, the magnitude of earthquakes, the intensity of sound, the doubling and half-life functions, fractal geometry, voting, apportionment, and redistricting.
- 3. Use network and graph theory to solve modern business and real-world applications.
- 4. Use appropriate technology such as calculators or computer software to enhance mathematical thinking, visualization, and understanding to solve mathematical problems and judge the reasonableness of the results.
- 5. Demonstrate quantitative reasoning skills by developing convincing arguments and by communicating mathematically both verbally and in writing.
- 6. Apply mathematics and quantitative reasoning to management of personal finance including credit card debt, loans, savings plans, mortgages, investments and taxes. Model and predict real-world quantities that are increasing and decreasing using percentages, linear and exponential growth and decay, logarithmic and logistic functions, doubling time and half-life. Calculate dimensions of natural objects using fractal geometry.

Lecture Content

THINKING CRITICALLY Recognizing Fallacies Propositions and Truth Values Sets and Venn Diagrams Analyzing Arguments Critical Thinking in Everyday Life APPROACHES TO PROBLEM SOLVING The Problem-Solving Power of Units Standardized Units: More Problem-Solving Power Problem-Solving Guidelines and Hints NUMBERS IN THE REAL WORLD Uses and Abuses of Percentages Putting Numbers in Perspective Dealing with Uncertainty Index Numbers: The CPI and Beyond How Numbers Deceive: Polygraphs, Mammograms, and More MANAGING YOUR MONEY Taking Control of Your Finances The Power of Compounding Savings Plans and Investments Loan Payments, Credit Cards, and Mortgages Income Taxes Understanding the Federal Budget STATISTICAL REASONING Fundamentals of Statistics Should You Believe a Statistical Study? Statistical Tables and Graphs Graphics in the Media Correlation and Causality PUTTING STATISTICS TO WORK Characterizing a Data Distribution Measures of Variation The Normal Distribution Statistical Inference PROBABILITY: LIVING WITH THE ODDS Fundamentals of Probability Combining Probabilities The Law of Large Numbers Assessing Risk Counting and Probability EXPONENTIAL ASTONISHMENT Growth: Linear versus Exponential Doubling Time and Half-Life Real Population Growth Logarithmic Scales: Earthquakes, Sounds, and Acids MODELING OUR WORLDS Functions: The Building Blocks of Mathematical Models Linear Modeling Expo nential Modeling MODELING WITH GEOMETRY Fundamentals of Geometry Problem Solving with Geometry Fractal Geometry MATHEMATICS AND THE ARTS Mathematics and Music Perspective and Symmetry Proportion and the Golden Ratio MATHEMATICS AND POLITICS Voting: Does the Majority Always Rule? Theory of Voting Apportionment: The House of Representatives and Beyond Dividing the Political Pie MATHEMATICS AND BUSINESS Network Analysis The Traveling Salesman Problem Scheduling Problems

Method(s) of Instruction

- Lecture (02)
- DE Online Lecture (02X)
- Video one-way (ITV, video) (63)
- Cable (CA)

Instructional Techniques

Instructional techniques include lecture, reading, homework, quizzes, exams (Midterm and Final), writing and research, and discussion.

Reading Assignments

Read assigned sections from the textbook.

Writing Assignments

Solve word problems. Read books, papers, visit websites, watch videos/films, write a paper.

Out-of-class Assignments

Do homework exercises and take online quizzes.

Demonstration of Critical Thinking

Solve word problems. Write a research paper.

Required Writing, Problem Solving, Skills Demonstration

Included as homework assignments, part of classroom lectures and discussions, part of quizzes, Midterm Examination, Final Examination, and Projects. Students will be able to explain solutions and justify reasoning verbally or in writing and may be included in classroom discussions, quizzes, Midterm Examination, Final Examination, and Projects.

Eligible Disciplines

Mathematics: Master's degree in mathematics or applied mathematics OR bachelor's degree in either of the above AND master's degree in statistics, physics, or mathematics education OR the equivalent. Master's degree required.

Textbooks Resources

1. Required Bennett, J.; Briggs, W. Using and Understanding Mathematics: A Quantitative Reasoning Approach, 7th ed. Pearson, 2019

Other Resources

1. Coastline Library 2. Student Handbook for Telecourse