MATH C101: APPLIED MATHEMATICS

Item	Value
Curriculum Committee Approval Date	02/23/2024
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
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Local General Education (GE)	• CL Option 1 Math Competency (CA3)

Course Description

This course offers the student an applications-oriented, problem-solving exploration into a variety of mathematical fields, including measurement, geometry, logic, ratio, proportion, set theory, probability, statistics, graph theory, and mathematics of finance. This course is designed not only to meet college general education requirements but to help generate a positive attitude toward and an interest in mathematics. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Apply critical thinking and mathematical principles to analyze arguments.
2. Solve applications related to finance.
3. Organize statistical data to draw appropriate conclusions.
4. Convert units between the U.S. customary measurement and metric measurement systems.

Course Objectives

- 1. Correctly solve problems involving unit conversions and analyses.
- 2. Apply true tables to verify symbolic statements and analyze logical arguments to draw the conclusions for decision-making.
- 3. Interpret the many different uses and abuses of percentages in the real-life application.
- 4. Use geometry to calculate the dimensions of actual objects, such as perimeters, areas, and volumes.
- 5. Correctly solve the real-world applications such as population growth, the magnitude of earthquakes, the intensity of sound, the doubling and half-life functions.
- 6. Use network and graph theory to solve modern business and real-world applications.
- 7. 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.
- 8. Demonstrate quantitative reasoning skills by developing convincing arguments and by communicating mathematically both verbally and in writing.
- 9. Apply mathematics and quantitative reasoning to management of personal finance including loans, savings plans, mortgages, investments and taxes.
- 10. 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.

Lecture Content

THINKING CRITICALLY Living in the Media Age Propositions and Truth Values Sets and Venn Diagrams Analyzing Arguments Critical Thinking in Everyday Life APPROACHES TO PROBLEM SOLVING Understand, Solve, and Explain Common Fractions and Decimals Changing Money in Foreign Countries Expanding Unit Analysis Using Technology for Metric Conversions Problem-Solving Hints NUMBERS IN THE REAL WORLD Uses and Abuses of Percentages Ratios and Proportions Putting Numbers in Perspective Working with Scientific Notations and Technology Rounding Off Decimals and Rounding in Excel Index Numbers: The CPI and Beyond MANAGING 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 Using Technology for Frequency Tables, Bar Graphs, Pie Charts, and Line Charts Graphics in the Media Correlation and Causality PUTTING STATISTICS TO WORK Characterizing Data, Using Technology for Mean, Median, and Mode Measures of Variation, Using Technology for Calculating the Standard Deviation The Normal Distribution, Using Technology for Standard Scores and Percentiles Statistical Inference PROBABILITY: LIVING WITH THE ODDS Fundamentals of Probability Combining Probabilities The Law of Large Numbers Assessing Risk Counting and Probabilit y, Using Technology for Permutations and Combinations 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 Using Technology for Linear Modeling Using Technology for Exponential Modeling MODELING WITH GEOMETRY Fundamentals of Geometry Problem Solving with Geometry Fractal Geometry

Method(s) of Instruction

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

Instructional Techniques

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

Do homework exercises and take online quizzes.

Out-of-class Assignments

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

Demonstration of Critical Thinking

Student performance on quizzes and exams which evaluate problem-solving techniques and understanding of specialized vocabulary. Solve word problems. Write a research paper.

Required Writing, Problem Solving, Skills Demonstration

Included as homework assignments, classroom lectures and discussions, quizzes, Midterm Examination, Final Examination, and Projects. Students are required to explain solutions and justify reasoning verbally or in writing.

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.

Other Resources

1. Coastline Library 2. OER Text, OpenStax, Contemporary Mathematics, https://openstax.org/details/books/contemporary-mathematics