MAT 143 Quantitative Literacy

COURSE DESCRIPTION:

Prerequisite(s):
Take One Set:
Set 1: DMA-010, DMA-020, DMA-030, and DRE-098
Set 2: DMA-010, DMA-020, DMA-030, and ENG-002
Set 3: DMA-010, DMA-020, DMA-030, and BSP-4002
Set 4: DMA-025, and DRE-098
Set 5: DMA-025, and ENG-002
Set 6: DMA-025, and BSP-4002
Set 7: MAT-003 and DRE-098
Set 8: MAT-003 and ENG-002
Set 9: MAT-003 and BSP-4002
Set 10: BSP-4003 and DRE-098
Set 11: BSP-4003 and ENG-002
Set 12: BSP-4003 and BSP-4002

Corequisite(s): Take MAT-043

This course is designed to engage students in complex and realistic situations involving the mathematical phenomena of quantity, change and relationship, and uncertainty through project- and activity-based assessment. Emphasis is placed on authentic contexts which will introduce the concepts of numeracy, proportional reasoning, dimensional analysis, rates of growth, personal finance, consumer statistics, practical probabilities, and mathematics for citizenship. Upon completion, students should be able to utilize quantitative information as consumers and to make personal, professional, and civic decisions by decoding, interpreting, using, and communicating quantitative information found in modern media and encountered in everyday life. *This is a Universal General Education Transfer Component (UGETC) course.*
Course Hours Per Week: Class, 2. Lab, 2. Semester Hours Credit, 3.

LEARNING OUTCOMES:

Upon completing requirements for this course, the student will be able to:

1. Judge the reasonableness of results using estimation, logical processes, and a proper understanding of quantity
2. Utilize proportional reasoning to solve contextual problems and make conversions involving various units of measurement
3. Identify, interpret, and compare linear and exponential rates of growth to make predictions and informed decisions based on data and graphs
4. Differentiate between simple and compound interest and analyze the long-term effects of saving, investing, and borrowing
5. Describe, analyze, and interpret statistical information such as graphs, tables, and summarized data to draw appropriate conclusions when presented with actual statistical studies
6. Determine probabilities and expected values and use them to assess risk and make informed decisions
7. Analyze civic and/or societal issues and critique decisions using relevant mathematics

OUTLINE OF INSTRUCTION:

I. Quantity and Proportion
Topics chosen from:

A. Relative sizes and scales of numbers (from the microscopic to astronomical)
B. Dimensional analysis
C. Judging the reasonableness of results using estimation, logical processes, and a proper understanding of quantity
D. Interpreting percentages using current media and data resources
E. Interpreting and translating between various representations of ratios encountered in context; e.g., decimals, fractions, rates, percentages, etc.
F. Calculating proportions and rates to make meaningful comparisons e.g., Simpson's Paradox, that are relevant to everyday life
G. Analyzing methods of apportionment and their effects on representation

II. Data and Uncertainty
Topics chosen from:

A. Experimental and theoretical probability
B. Given a two-way table of real-world data calculate probabilities involving AND, OR, and NOT statements and conditional probabilities
C. Given the rate of occurrence of a disorder and sensitivity or specificity of a test for said disorder construct a two-way table that models the number of occurrences for a given sample size
D. Given real world probability data or odds relating to games of chance, insurance policies, etc. calculate the expected value for a specified outcome. Use expected value to justify decisions in given scenarios
E. Describe data values in real world contexts using appropriate measures of central tendency and spread
F. Given data from a media source use technology to construct one or more of the following types of graphs; box-plot, histogram, bar, stack plot, time-series, or pie chart
G. Interpreting a variety of basic and sophisticated graphics from media sources
H. Given a mean and standard deviation of a distribution determine the z-score and percentile of a given data point, and communicate this information in a meaningful sentence
I. Explain the meaning of a poll or study that provides the margin of error and confidence level
J. Compare and contrast observational and experimental studies, and critique how the design influences the conclusions drawn

III. Financial Literacy
Topics chosen from:

A. Use the ideas of linear and exponential functions to develop the concepts of simple and compound interest
B. Calculate simple and compound interest
C. Show the difference between APR and APY
D. Model and analyze different savings plans and their outcomes
E. Use online tools to determine payments on consumer loans
F. Create amortization tables using technology, exploring various scenarios, and communicate conclusions
G. Ask appropriate questions about loan terms

H. Explore and analyze a variety of consumer loans considering individual budget constraints and communicate findings
I. Examine credit card terminology, perform basic credit card computations, and evaluate pay off options
J. Interpret financial terminology used by various types of media involving taxes, stocks, and bonds
K. Compute and compare income taxes for various situations such as income bracket, marital status, credits and deductions

IV. Analysis of Growth
Topics chosen from:

A. Compute and analyze rates of change (percentage, absolute, average) from selected tables and graphs
B. Use growth rates to analyze quantitative data in various contexts including real world data, student generated data or data found in current media
C. Use Interpolation and Extrapolation of real world data and describe when each is appropriately used
D. Critique the construction of graphs, charts and visual displays of quantitative information which may be misleading
E. Given linear and exponential data, interpret the rate of change within the given context
F. Represent linear and exponential models as equations, tables, graphs and verbal descriptions
G. Use technology to construct the appropriate linear or exponential models for sets of data and interpret the rate of change using appropriate units
H. Identify data that models constant rates of change and explain the significance of either the absolute or relative change
I. Using current media sources, describe the significance and implications of exponential growth or decay

REQUIRED TEXTBOOK AND MATERIAL:

The textbook and other instructional material will be determined by the chair/instructor.