



Course Name: Quantitative Reasoning

Course Number: MAT*E104

Credits: 3

Catalog description: A survey course to develop the abilities to interpret and reason with information that involves mathematical ideas or numbers. This course will prepare students for the mathematics they will encounter in other college courses and in their career as well as help develop critical thinking and problem solving skills needed in all areas of life. Topics include principles of reasoning, problem solving techniques, basic statistics, every day mathematical models, and the mathematics involved in personal finance, the arts, careers, and society in general.

Prerequisite: Satisfactory score on placement test or MAT095 or MAT095I with a grade of C or higher, or high school transcript with Algebra I with a grade of C or higher in the past 5 years, and eligible for ENG 101.

General Education Competencies Satisfied:

HCC General Education Requirement Designated Competency Attribute Code(s):
None

Discipline-Specific Attribute Code(s):

MATH Mathematics elective

Course objectives:

General Education Goals and Outcomes:

None.

Course Specific Objectives:

1. Exhibit perseverance, ability, and confidence to use mathematics to make sense of and solve problems
2. Perform mental arithmetic and use proportional reasoning
3. Analyze problem situations through numerical, graphical, symbolic and/or verbal approaches and modeling
4. Use appropriate tools strategically in solving problems



5. Recognize patterns, draw inferences
6. Communicate and interpret results
7. Demonstrate an understanding and appreciation of the usefulness of mathematics in everyday life

Course Content:

Quantitative Literacy Outcomes

Students will demonstrate quantitative reasoning to analyze problems, critique arguments, and draw and justify conclusions using the following skills and concepts:

- 0.1 Performing arithmetic operations
- 0.2 Using proportional reasoning, geometric concepts of area and volume, statistical and probabilistic reasoning
- 0.3 Understanding how quantities change including, but not limited to multiplicative vs. additive and relative vs. absolute
- 0.4 Estimating both in terms of mathematical calculations, and in contexts where estimation of values is essential because exact measures are unknown
- 0.5 Making comparisons based on relative magnitude
- 0.6 Understanding the magnitude and representations of numbers
- 0.7 Understanding and using concepts of measurement: units, precision, accuracy, error
- 0.8 Creating and using models (tables, words, graphs and equations) of real world situations
- 0.9 Checking answers and determining the reasonableness of results
- 0.10 Reading and interpreting quantitative information from a variety of real—world sources
- 0.11 Knowing where to find relevant data and how to evaluate its appropriateness for purpose and validity of source
- 0.12 Organizing and translating between and among various representations of quantitative information
- 0.13 Analyzing and using quantitative information to support an argument
- 0.14 Recognizing, making and evaluating quantitative assumptions

Students will communicate quantitative results in writing and orally using appropriate language, symbolism, data and graphs.

Students will use technology appropriately as a tool, including using computers and the Internet to gather, research and analyze quantitative information, using spreadsheets, data simulations and other appropriate technology, and knowing when and how to use calculators appropriately.

II. Mathematics Learning Outcomes

Numeracy: Students will develop and apply the concepts of numeracy to investigate and describe quantitative relationships and solve problems in a variety of contexts. Therefore, students will be able to:

MAT*E104



N.1 Demonstrate operation sense and communicate verbally and symbolically the effects of common operations on numbers.

N.2 Demonstrate an understanding of and competency in using magnitude in the context of place values, fractions, and numbers written in scientific notation.

N.3 Use estimation skills, knowing how and when to estimate results and to what precision, to solve problems, detect errors, and check accuracy.

N.4 Apply quantitative reasoning to perform calculations in applications involving quantities or rates.

N.5 Demonstrate measurement sense.

N.6 Demonstrate an understanding of the mathematical properties and uses of different types of mathematical summaries of data (e., measures of central tendency) and mathematical models.

N.7 Read, interpret, and make decisions based on data from graphical displays (e., line graphs, bar graphs, scatter plots, histograms).

Proportional Reasoning: Students will represent proportional relationships and solve problems that require an understanding of ratios, rates, proportions, and scaling. Therefore, students will be able to:

P.1 Recognize proportional relationships from verbal and numeric representations.

P.2 Compare proportional relationships represented in different ways.

P.3 Apply quantitative reasoning strategies to solve real world problems with proportional relationships based on an understanding that derived quantities can be described with whole numbers, fractions, or decimals, or in a combination of these, and that to fully explain these relationships, units must be used.

Algebraic Reasoning: Students will reason using the language and structure of algebra to investigate, represent, and solve problems. Therefore, students will be able to:

A.1 Understand various uses of variables to represent quantities or attributes.

A.2 Describe the effect that a change in the value of one variable has on the values) of other variables in the algebraic relationship.

A.3 Construct and use equations or inequalities to represent relationships involving one or more unknown or variable quantities to solve problems.

Functions: Students will represent relationships between quantities in multiple ways and solve problems that require an understanding of functions. Therefore, students will be able to:

F.1 Translate problems from a variety of contexts into a mathematical representation and vice versa.

F.2 Describe the behavior of common types of functions using words, algebraic symbols, graphs, and tables.

F.3 Identify when a linear model or trend is reasonable for given data; when a linear model does not appear to be reasonable, know how to explore the applicability of other models.



F.4 Identify important characteristics of functions in various representations.

F.5 Use appropriate terms and units to describe rate of change.

F.6 Understand that abstract mathematical models used to characterize real world scenarios or physical relationships are not always exact and may be subject to error from many sources, including variability.

Date Created:

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