



Course Number and Title: MAT 099 Foundations of Mathematical Reasoning

Campus Location:

Georgetown, Dover, Stanton, Wilmington

Effective Date:

2022-51

Prerequisite:

None

Co-Requisites:

None

Course Credits and Hours:

4.00 credits

4.00 lecture hours/week

0.00 lab hours/week

Course Description:

Foundations of Mathematical Reasoning helps students develop conceptual understanding and acquire multiple strategies for solving problems. It is a quantitative literacy-based course that provides the skills and conceptual understandings needed to be successful in college-level statistics, quantitative literacy, or STEM path algebraic reasoning.

Required Text(s):

Obtain current textbook information by viewing the [campus bookstore - https://www.dtcc.edu/bookstores](https://www.dtcc.edu/bookstores) online or visit a campus bookstore. Check your course schedule for the course number and section.

Additional Materials:

Graphing Calculator

Schedule Type:

Classroom Course

Video Conferencing

Web Conferencing

Hybrid Course

Online Course

Hyflex

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Apply concepts of numeracy to investigate and describe quantitative relationships and solve real-world problems in a variety of contexts in order to develop number sense. (CCC 2,6)
2. Solve problems using proportional reasoning that require ratios, rates, proportions, and scaling. (CCC 2,6)
3. Represent relationships between quantities and solve problems by transitioning from specific and numeric reasoning to using general and abstract reasoning. (CCC 2,6)
4. Evaluate statements that appear in popular media involving risk and arguments based on probability. (CCC 2,6)
5. Interpret financial information commonly presented to consumers in order to make decisions. (CCC 2,6)
6. Determine when quantitative information presented in the media and other entities is useful or misleading. (CCC 2,6)

See Core Curriculum Competencies and Program Graduate Competencies at the end of the syllabus. CCPOs are linked to every competency they develop.

Measurable Performance Objectives (MPOs):

Upon completion of this course, the student will:

1. Apply concepts of numeracy to investigate and describe quantitative relationships and solve real-world problems in a variety of contexts in order to develop number sense.
 1. Demonstrate operation sense and communicate it verbally and symbolically with real numbers by doing such things as make decisions on when to use technology, identify errors, and make predictions.
 2. Demonstrate an understanding of fractions, decimals, and percentages by representing quantities in equivalent forms, using a range of strategies to compare the size of numbers in different forms, and interpreting the meaning of numbers in different forms.
 3. Solve problems involving calculations with percentages communicate the meaning of the results within a range of problem contexts.
 4. Interpret large and small numbers in different forms (words, fractions, decimals, standard notation, scientific notation) and compare magnitudes.
 5. Use estimation skills and know why, how, and when to estimate results.
 6. Solve problems involving measurement including the correct use of units.
 7. Convert between units of measurement using dimensional analysis in order to solve problems involving multiple units of measurement.
 8. Read, interpret, and make decisions about data summarized numerically (e.g., measures of central tendency and spread) in tables, and in graphical displays (e.g., line graphs, bar graphs, scatter plots, and histograms)
2. Solve problems using proportional reasoning that require ratios, rates, proportions, and scaling.
 1. Represent and use ratios in a variety of forms (including percentages) and contexts
 2. Determine whether a proportional relationship exists based on how one value influences another value.
 3. Analyze, represent, and solve real-world problems involving proportional relationships, with attention to appropriate use of units.
3. Represent relationships between quantities and solve problems by transitioning from specific and numeric reasoning to using general and abstract reasoning.
 1. Demonstrate understanding of the meaning and uses of variables as unknowns, in equations, in simplifying expressions, and as quantities that vary, and use that understanding to represent quantitative situations symbolically.
 2. Describe, identify, compare, and contrast the effect of multiplicative or additive change.
 3. Analyze real-world situations, and use variables to construct and solve equations involving one or more unknown or variable quantities.
 4. Express and interpret relationships using inequality symbols in a variety of mathematical contexts such as probability and graphing.
 5. Construct and use linear and exponential math models to solve problems from a variety of contexts and to make predictions/decisions such as, but not limited to, examining growth in a saving account over time.
 6. Represent mathematical models in verbal, algebraic, graphical, and tabular form and be able to move between these different representations fluidly.
 7. Recognize when a linear model is appropriate and, if appropriate, use a linear model to represent the relationship between two quantitative variables.
4. Evaluate statements that appear in popular media involving risk and arguments based on probability.
 1. Interpret statements about chance, risk, and probability that appear in everyday media (including terms like unlikely, rare, impossible).
 2. Identify common pitfalls in reasoning about risk and probability.
 3. Interpret in context marginal, joint, and conditional relative frequencies in context for data summarize in a two-way table and identify which relative frequency is appropriate to answer a contextual question.
 4. Describe how absolute risk and relative risk (percentage change in risk) provides different information about risk.
5. Interpret financial information commonly presented to consumers in order to make decisions.
 1. Explain common types of consumer debt and how different factors affect the amount the consumer pays.
 2. Explain compound interest and how it relates to saving money.
 3. Identify erroneous or misleading information in advertising or consumer information.
6. Determine when quantitative information presented in the media and other entities is useful or misleading.
 1. Use quantitative information to explore the impact of policies or behaviors on a population to include social, economic, or environmental impacts.
 2. Identify erroneous, misleading, or conflicting information presented by individuals or groups regarding social, economic, or environmental issues.

Evaluation Criteria/Policies:

The grade will be determined using the Delaware Tech grading system:

90	-	100	=	A
80	-	89	=	B
70	-	79	=	C
0	-	69	=	F

Students should refer to the [Student Handbook - https://www.dtcc.edu/handbook](https://www.dtcc.edu/handbook) for information on the Academic Standing Policy, the Academic Integrity Policy, Student Rights and Responsibilities, and other policies relevant to their academic progress.

Final Course Grade:

Calculated using the following weighted average

Evaluation Measure	Percentage of final grade
Homework (Preview and Practice)	15%
Lesson Quizzes	15%
Formative	20%
Exams	50%
TOTAL	100%

Core Curriculum Competencies (CCCs are the competencies every graduate will develop):

1. Apply clear and effective communication skills.
2. Use critical thinking to solve problems.
3. Collaborate to achieve a common goal.
4. Demonstrate professional and ethical conduct.
5. Use information literacy for effective vocational and/or academic research.
6. Apply quantitative reasoning and/or scientific inquiry to solve practical problems.

Program Graduate Competencies (PGCs are the competencies every graduate will develop specific to his or her major):

None

Disabilities Support Statement:

The College is committed to providing reasonable accommodations for students with disabilities. Students are encouraged to schedule an appointment with the campus Disabilities Support Counselor to request an accommodation needed due to a disability. A listing of campus Disabilities Support Counselors and contact information can be found at the [disabilities services - https://www.dtcc.edu/disabilitysupport](https://www.dtcc.edu/disabilitysupport) web page or visit the campus Advising Center.