



Course Number and Title: MAT 153 College Math and Statistics

Campus Location:

Georgetown, Dover, Stanton, Wilmington

Effective Date:

2018-51

Prerequisite:

MAT 020, SSC 100 or concurrent

Co-Requisites:

None

Course Credits and Hours:

4.00 credits

4.00 lecture hours/week

0.00 lab hours/week

Course Description:

This course builds the relationship between mathematics and real-world applications, particularly in business and health sciences. Students graph and interpret functions to solve applications involving linear, quadratic, exponential, and logarithmic functions, as well as systems of linear equations and inequalities. Applications in elementary statistics, organizing and presenting data, measures of central tendency and variation, and normal and sampling distributions are included.

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

Hybrid Course

Disclaimer:

None

Core Course Performance Objectives (CCPOs):

1. Perform basic operations involving exponents and radicals. (CCC 6)
2. Solve application problems involving linear and quadratic functions. (CCC 2, 6)
3. Sketch the graphs of functions. (CCC 6)
4. Solve application problems involving systems of linear equations and inequalities. (CCC 2, 6)
5. Solve application problems involving exponential and logarithmic functions. (CCC 2, 6)
6. Compute, analyze, and interpret statistical data. (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. Perform basic operations involving exponents and radicals.
 1. Perform operations involving basic properties and definitions of exponents, including rational exponents.
 2. Simplify radicals and expressions involving radicals.
 3. Convert from rational exponents to radicals and vice-versa.
 4. Evaluate rational exponents and radicals within the real number system.
2. Solve application problems involving linear and quadratic functions.
 1. Solve linear and literal equations for one variable.
 2. Solve linear inequalities in one variable, and write the solutions using interval notation.
 3. Construct linear models using linear regression and appropriate technology.
 4. Compute and interpret the correlation coefficient of a linear model, using appropriate technology.
 5. Solve quadratic equations within the real number system using the zero product property, square root property, and the quadratic formula.
 6. Use the discriminant to determine the number of real solutions of a quadratic equation.
 7. Write a quadratic function in both standard and general forms.
 8. Identify the vertex of a quadratic function in standard form, in general form, and in applications, and interpret the coordinates of the vertex (minimum or maximum value).
 9. Construct models using quadratic regression.
 10. Solve and model applications of linear and quadratic functions.
3. Sketch the graphs of functions.
 1. Identify relations that represent functions graphically and algebraically.
 2. Evaluate a function for any given input, including but not limited to linear, quadratic, polynomial, and piecewise-defined functions.
 3. Write the domain and range of a function in interval notation given the rule of the function or given a graph of the function.
 4. Sketch the graphs of linear, quadratic, polynomial and piecewise-defined functions.
4. Solve application problems involving systems of linear equations and inequalities.
 1. Solve systems of linear equations in three variables by using matrices and appropriate technology.
 2. Model and solve applications of systems of linear equations in three variables.
 3. Model and solve linear programming applications using appropriate technology.
5. Solve application problems involving exponential and logarithmic functions.
 1. Graph exponential functions, and identify domain, range, intercept(s), growth/decay behavior, and horizontal asymptote.
 2. Convert exponential equations to logarithmic equations and vice versa.
 3. Find the logarithm of a number without the use of a calculator.
 4. Express the logarithm of a number using the change-of-base theorem.
 5. Use properties of logarithms to simplify and expand logarithmic expressions.
 6. Interpret the graph of logarithmic functions, and identify domain, range, intercept(s), and vertical asymptote.
 7. Solve exponential and logarithmic equations involving a single base.
 8. Solve application problems involving exponential and logarithmic functions.
6. Compute, analyze, and interpret statistical data.
 1. Distinguish between population parameters and sample statistics.
 2. Identify the sampling technique, given the description of a sampling procedure (random, stratified, systematic, cluster, or convenience).
 3. Arrange raw data into a grouped frequency distribution.
 4. Graph histograms and frequency polygons using a grouped frequency distribution.
 5. Find the mean and modal class of grouped data.
 6. Find the mean, median, and mode from raw data and from data in a frequency table.
 7. Find the sample standard deviation of grouped and raw data using appropriate technology.
 8. Compare and contrast two or more sets of data using mean, median, mode, and standard deviation.
 9. Interpret a box-and-whisker plot.
 10. Find z-scores of sample data, and solve applied situations involving normal distributions.
 11. Use sampling distributions and the central limit theorem to calculate the probability of an event.
 12. Construct the confidence interval and find the margin of error for the population mean when the population standard deviation is known.
 13. Determine the necessary sample size given the reliability, level of confidence, allowable error, and variance.

Evaluation Criteria/Policies:

Students must demonstrate proficiency on all CCPOs at a minimal 75 percent level to successfully complete the course. The grade will be determined using the Delaware Tech grading system:

92	-	100	=	A
83	-	91	=	B
75	-	82	=	C
0	-	74	=	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.

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.