SYLLABUS

Code: **MATH 152** **Title**: **COLLEGE ALGEBRA & TRIGONOMETRY**

Institute: STEM **Department: MATHEMATICS**

Course Description: This course, followed by MATH 153, prepares students for the study of calculus. Topics include functions and function notation, rate of change and linear functions, quadratic functions, power functions, and polynomial functions, transformations of functions, a review of right triangle trigonometry, graphing trigonometric functions, trigonometric functions through the unit circle, some basic trigonometric identities, applications leading to sinusoidal graphs, and inverse trigonometric functions. Problems are approached from a variety of perspectives, including graphical, numerical, verbal, and algebraic. A graphing calculator is required; the specific model is determined by the Mathematics Department.

Section Information: All tests will be proctored in person.

Prerequisites: A grade of C or higher in MATH 151 or equivalent.

Credits: 4 **Lecture Hours:** 4 **Lab:** 0

REQUIRED TEXTBOOK/MATERIALS

1. **Textbook:** Stewart, Redlin, Watson, Precalculus Mathematics for Calculus, 7th edition. Brooks/Cole Cengage Learning, 2015.

   Note:
   - For textbook information in hybrid sections, see Instructor Addendum.
   - **Enhanced WebAssign (EWA)** will be required for online homework in some sections. Check with your instructor. The College bookstore sells the textbook in a bundle which includes an EWA access code. If you buy a used textbook, an access code can be purchased online at www.cengagebrain.com

2. **Graphing Calculator:** The calculator for this course is the TI-83 (any version) or TI-84 (any version). The use of any other calculator should be discussed with the instructor. The TI-89 and TI-92 may not be used for testing.
3. **Graph paper**
4. **Ruler:** You should bring a small ruler to each class.

ADDITIONAL TIME REQUIREMENTS

There are group projects during the course. You will need to allow some on-campus time during each project to meet with your group.

OTHER TIME COMMITMENTS:

- In addition to the regular class hours, you will need to set aside time each week for homework. The weekly time will vary by topic and level of difficulty, but as an estimate, you should expect two homework hours for *each* class hour per week. For example, if your class meets for four hours per week, you should expect to spend about ***eight*** hours per week on homework.

- If you are having any difficulty with the course material, you may need to allow time to see your instructor during office hours or to get help in the Math Lab.

COURSE LEARNING OUTCOMES

Upon completion of this course, students will be able to:

- Demonstrate the mathematical skills appropriate to this course. (M)
- Identify characteristics of and distinguish among the following functions: linear, quadratic, polynomial, and the six trigonometric by interpreting verbal, graphical, numerical, and symbolic representations. (M)
- Use the appropriate function model to analyze and solve application problems. (M)
- Interpret solutions in the context of the problem. (M)
- Use a graphing calculator to understand concepts and to explore and solve problems. (M)

Learning Outcome(s) support the following General Education Knowledge Areas:

- (M) Mathematics

GRADING STANDARD: In this course, you will be evaluated by means of tests, projects, quizzes, (and possibly group activities and homework).

A. TESTS

There will be three tests, one after each unit. Each test will have two parts: a graphing calculator part and a non-calculator part. All supporting work must be shown on tests in order for your instructor to properly assess your understanding of the material. The tests will be given in class and it is expected that you will be in class to take the test on the day it is given. If you are very ill (verifiable with a doctor's note) or you have some other emergency, you *must* contact your instructor immediately. Each test will be worth 25% of your grade.

Note: All tests will be proctored in person, see Instructor Addendum for more information.

B. QUIZZES/HOMEWORK/ACTIVITIES

There are periodic quizzes in the course and there may be several group activities. Activities are done in groups during class time and may be assessed either individually or as a group assignment. Your instructor may also choose to use homework assignments for evaluation.

C. PROJECTS

There will be at least three projects for the course, to be done in groups outside of class. In the projects, you will apply the concepts and skills learned in class to a problem situation, present the mathematics, write careful explanations, and interpret your results. Specific guidelines for the projects will be handed out with Project 1.

GRADING

Each test is graded on the basis of 100 points and is worth 25% of your grade. Quizzes, homework, activities, and projects result in a combined grade worth 25% of your grade. Your instructor's addendum will state the exact percentages of each.

FINAL GRADE

Your final grade is determined as follows:

If your final course average is	Your final grade is
90 – 100	A
88 – 89	A^-
86 – 87	B^+
80 – 85	B
78 – 79	B^-
76 – 77	C^+
70 – 75	C
60 – 69	D**
Below 60	F

** To use this course as a prerequisite for another mathematics course, you must have a grade of C or better.

Incomplete

INC is only given at the discretion of your instructor. This may occur in documented cases of hardship or emergency. In this case, you must meet with the instructor to discuss the work that must be completed to earn a grade in the course. All work must be completed within 21 days after the end of the term, exclusive of official college closings.

Withdrawal

You may withdraw from the course, without penalty, up to a date set by the College. If you do not withdraw from the course but stop attending, your grade at the end of the semester will be F.

COURSE CONTENT: (Text Section)

Unit 1: In this unit, you will study functions and function notation, rate of change and linear functions, a library of basic functions, and transformations of functions.

Unit 1 Outcomes: You will:
- Determine and interpret the average rate of change of a function on an interval. (1.10)
- Determine the slope and equation of a linear function. (1.10)
- Interpret the slope and intercepts of a linear function. (1.10)
- Solve applications problems involving linear functions and interpret the results in the context of the situation. (1.10)
- Use technology to determine linear regression equations for a set of data. (pages 139-144)
- Know the definition of a function. (2.1)
- Determine whether a graph, a table, or an equation represents a function. (2.1)

- Use function notation to express relationships and evaluate functions. (2.1)
- Evaluate a function at numerical and variable inputs and simplify the result algebraically. (2.1)
- Determine the domain and range of a function. (2.1)
- Know the properties of those functions that are introduced in this unit and are in the library of basic functions. (2.2)

- Graph a piecewise function and determine its domain and range. (2.2)
- Write a formula for a piecewise function from an application or a graph. (2.2)
- Given an output for a function, write and solve an equation (algebraically and graphically) to find the input. (2.3)
- Investigate functions that model a given problem situation and use the function to answer questions (including optimization) about the situation. (2.3)
- Use a graph or table to determine where a function is increasing or decreasing and where a function is concave up or concave down, and write the result in interval notation. (2.4)
- Graph a function using a transformation. (2.6)
- Find a formula for the graph of a transformed function's graph in terms of the original function. (2.6)

Unit 2: In this unit, you will form new functions by combining functions, and will learn about composition and the inverse of one-to-one functions. You will investigate quadratic, power, and polynomial functions. The unit continues with a review of right triangle trigonometry. You will be able to define exact values for special angles and their multiples, graph trigonometric functions, investigate some applications leading to sinusoidal graphs, and define trigonometric functions through the unit circle.

Unit 2 Outcomes: You will:

- Find and simplify the sum, difference, product, and quotient functions given two functions. (2.7)
- Find the composition of two or more functions and determine the domain. (2.7)
- Express a given function as the composition of two or more functions. (2.7)
- Use inverse function notation correctly. (2.8)
- Determine whether two functions are inverses of each other. (2.8)
- Find the inverse of a given function if it has one. (2.8)
- Know the definition of a quadratic function. (3.1)
- Graph a quadratic function by finding the vertex and intercepts. (3.1)
- Find the equation for a quadratic function given sufficient information. (3.1)
- Recognize the various forms of a quadratic function: standard, vertex, and factored form; and identify the information given from each form. (3.1)
- Solve application problems involving quadratic functions. (3.1)
- Know the definition of a power function and a polynomial function. (3.2)
- Give the basic shape of the graph of a power function based on its power and the sign of the coefficient. (3.2)
- Find the equation of a power function given two points. (3.2)
- Identify the long-run behavior of a polynomial function. (3.2)
- Find the zeros of a polynomial function algebraically, when possible, or graphically. (3.2)
- Graph a polynomial function by identifying the long run and short run behavior. (3.2)
- Find the equation of a polynomial function given sufficient information. (3.2)
- Solve quadratic and other polynomial equations algebraically and graphically. (3.2)

- Solve application problems involving polynomial functions. (3.2)
- Define and use radian measure of an angle. (6.1)
- Convert between radian and degree measure of an angle. (6.1)
- Define the trigonometric functions as ratios in a right triangle. (6.2)
- Know the exact values of the trigonometric functions for special angles. (6.2)
- Find the values of trigonometric functions for any angle. (6.3)
- Define the trigonometric functions as coordinates of points on the unit circle. (5.1)

Unit 3: In this unit, you will study the graphs of trigonometric functions and applications of sinusoidal graphs. You will study the inverse trigonometric functions and practice the skills needed to solve trigonometric equations graphically and analytically.

Unit 3 Outcomes: You will:

- Graph the sine and cosine functions by hand. (5.2)
- Know the properties of the graphs of the sine and cosine functions. (5.2)
- Graph sine and cosine functions using transformations, including shifts, reflections, compressions, and stretches. (5.3)
- Find a formula for a transformed sinusoidal graph in terms of either sine or cosine. (5.3)
- Recognize that periodic phenomena can be modeled by trigonometric functions. (pages 466-468)
- Use a sinusoidal regression to model a function for a set of periodic data. (page 466-468)
- Graph the remaining four trigonometric functions by hand. (5.4)
- Use special values to solve trigonometric equations graphically and analytically. (7.4)
- Define the inverse sine, cosine, and tangent functions, their domains and ranges, and properties of their graphs. (5.5)
- Define the inverse secant function and its domain and range. (5.5)
- Solve trigonometric equations using inverse trigonometric functions. (7.4)
- Solve trigonometric equations graphically. (7.4)

DEPARTMENT POLICIES

The Math Department wants you to be successful in this course. Because of this, we have compiled a list of strategies and behaviors.

Attendance and class participation

- If you want to be successful in this course, attend every class.
- Come to class on time, and stay for the entire class period. If you are late or leave during class, you will miss important class material and you will also distract your classmates and your instructor. (See the Student Conduct Code)
- Turn off your cell phone during class. You and your classmates need to be free from distractions. (See the Student Conduct Code)
- Bring your book and calculator to every class.
- Respect your classmates and your instructor. Listen carefully to questions asked and answers given. Treat all questions with respect.
- Participate fully in class. Volunteer answers, work problems, take careful notes, and engage in discussions about the material. Use computers only for designated work. Above all, stay on task.

- Contribute your share to your in-class group work and do your best to make the group experience a positive one for all members.
- Do your own work on tests and quizzes. Cheating will not be tolerated. (See the Academic Integrity Code.)

Homework

- Homework is the way you practice the ideas and skills that are introduced in class. To be successful on the tests, you must do the homework. Homework may be collected and homework questions may be included on quizzes or tests.
- When you do the homework, write down all supporting work. Using the correct process is at least as important as getting the correct answer, so your work and steps are very important.
- Remember to check your answers. They will either be in the back of the text or in the back of the homework packet.
- If there are questions you can't get or don't understand, ask about them at the beginning of the next class. If you have trouble with more than a few problems, try starting your homework in the Math Lab, where help is available.

Absence

- If you are sick and an absence is unavoidable, please call or email your instructor. You are still responsible for all material that was covered during your absence. You are expected to read the textbook and do the homework.
- Make time to see your instructor when you return so that you can get any papers you missed.
- Remember that you are expected to be in class for the tests and quizzes.

Getting Help

After you have tried the homework, there are ways to get help:

- Look in your text and your class notes for examples similar to the problems you are finding difficult.
- See your instructor during office hours or make an appointment. Bring the work you have done.
- Go to the **Math Lab** to get extra help on your homework or simply go and do your homework there. Someone will be there if you get stuck. You don't need an appointment to use the Math Lab.
- Form a **study group** with other class members. Working with other students can be a great way to learn. If you have a group to work with, consider meeting and working together in the Math Lab.
- Your textbook may have a complete solutions manual available in the Math Lab, which can be used in the Math Lab.
- You can use the computers in the computer lab within the Math Lab to do work related to your math course.
- In the Math Lab, you can get help on how to use your calculator.

Visit the **Math Lab website** to view hours and other useful information about the Math Lab.

COLLEGE POLICIES:

As an academic institution, Brookdale facilitates the free exchange of ideas, upholds the virtues of civil discourse, and honors diverse perspectives informed by credible sources. Our College values all students and strives for inclusion and safety regardless of a student's disability, age, sex, gender identity, sexual orientation, race, ethnicity, country of origin, immigration status, religious affiliation, political orientation, socioeconomic standing, and veteran status. For additional information, support services, and engagement opportunities, please visit **www.brookdalecc.edu/support .**

For information regarding:

- Academic Integrity Code
- Student Conduct Code
- Student Grade Appeal Process

Please refer to the **Student Handbook** and **Catalog.**

Notification for Students with Disabilities:

Brookdale Community College offers reasonable accommodations and/or services to persons with disabilities. Students with disabilities who wish to self-identify must contact the Accessibility Services Office at 732-224-2730 (voice) or 732-842-4211 (TTY) to provide appropriate documentation of the disability and request specific accommodations or services. If a student qualifies, reasonable accommodations and/or services, which are appropriate for the college level and are recommended in the documentation, can be approved.

Mental Health:

24/7/365 Resources:

- Monmouth Medical Center Psychiatric Emergency Services at (732) 923-6999
- 2nd Floor Youth Helpline – Available to talk with you about any problem, distress, or hardship you are experiencing. Call or text at 888-222-2228 or visit the website at **https://www.2ndfloor.org/**

Faculty Counselors:

- Students who need to make an appointment with a faculty counselor can do so by calling 732-224-1822 (non-emergency line) during business hours. Faculty counselors are licensed mental health professionals who can assist students and refer them to other mental health resources.

Diversity Statement:

Brookdale Community College fosters an environment of inclusion and belonging. We promote a safe and open culture, encourage dialogue respecting diverse perspectives informed by credible sources, and uphold the virtues of civil discourse. We celebrate all identities with the understanding that ultimately, diversity, equity, and inclusion cultivate belonging and make us a stronger Brookdale community.

**The syllabus is intended to give student guidance in what may be covered during the semester and will be followed as closely as possible. However, the faculty member reserves the right to modify, supplement, and make changes as the need arise.*