# *SYLLABUS*

**Code**: **MATH 156** **Title**: **MATHEMATICS FOR MANAGEMENT AND THE SOCIAL SCIENCES**

**Institute: STEM** **Department: MATHEMATICS**

**Course Description:** This course prepares students for a college level business calculus course. Functions and their graphs are studied, including polynomial, rational, exponential, and logarithmic functions. Topics also include systems of linear equations, matrix algebra, linear programming (graphical solution and simplex method) and the mathematics of finance. All topics include applications in the management, life, and social sciences. Computer software will be used in class to gain a greater understanding of underlying concepts. This course is recommended for Business majors.

**Prerequisites:** A grade of C or higher in MATH 145 or MATH 151.

**Credits**: 3 **Lecture Hours:** 3 **Lab:** 0

***REQUIRED TEXTBOOK/MATERIALS:***

1. **Textbook:** Harshbarger/Reynolds, Mathematical Applications for the Management, Life, and Social Sciences, 12th Edition, Cengage, 2019.

   **Note:**

   - For textbook information in hybrid sections, see Instructor Addendum.
   - 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 a WebAssign access code. You may also purchase the stand alone WebAssign access code (with ebook) at the College bookstore.

2. **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.

***ADDITIONAL TIME REQUIREMENTS***:

You may need to allow some on-campus time during each unit to meet with your group to work on the unit projects. Some discussions can be done via email, but you may need some group meeting time and your group may need to meet with your instructor to discuss parts of the project.

***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 three hours per week, you should expect to spend about ***six*** hours per week on homework.
- You may need to allow time on campus to do homework problems that require the use of computer software.
- 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.

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***COURSE LEARNING OUTCOMES***:

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

- Demonstrate the mathematical skills appropriate to this course. (M)
- Identify and distinguish the properties and graphs of the following functions: linear, quadratic, power, polynomial, rational, exponential, and logarithmic. (M)
- Analyze and solve business application problems. (M)
- Write and interpret solutions using vocabulary consistent with business applications. (M)
- Use computer software 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, quizzes, and projects/homework/other assignments.

## A. TESTS

There will be three tests, one after each unit. All tests will be cumulative. All supporting work must be shown on tests in order for your instructor to properly assess your understanding of the material. The computer is used on these tests, although there may be non-computer parts. 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.

**Note:** For testing information in hybrid sections, see Instructor Addendum.

## B. QUIZZES

There are periodic quizzes in the course. Some of these may be online quizzes.

## C. PROJECTS/HOMEWORK/OTHER ASSIGNMENTS

There is one group project for each unit of the course. In the project, you will apply the concepts and skills learned in class to a problem situation, present the mathematics, write careful explanations, and interpret your results. The final copy of each project will be kept by your instructor.
Your instructor may also choose to use homework and other assignments for evaluation, which may be online as well.

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## GRADING

At the end of the semester, you will have three test grades, quiz grades, and projects /homework/other assignments grades. See your instructor addendum for how quizzes, projects, homework and other assignments will be averaged into your final grade. There are no grade curves applied in this course.

Your final course average is determined by a weighted average as follows:

| | |
|---|---|
| Test 1 | 25% |
| Test 2 | 25% |
| Test 3 | 25% |
| Quizzes | 10% |
| Projects/Homework/Other Assignments | 15% |

## 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.

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***COURSE CONTENT:*** **(TEXT SECTION)**

**Unit 1:** In this unit, you will study linear functions as they apply to business applications, and solve systems of linear equations. You will also study quadratic, polynomial, power, rational and piecewise functions, and the use of these functions as they apply to business applications.

**Unit 1 Outcomes:** You will:

- Use function notation for business functions (1.6)
- Define business functions (1.6)
- Graph linear functions using computer software (1.4)
- Interpret slope and *y*-intercept for business functions (1.6)
- Find and interpret Marginal Revenue, Cost and Profit for linear functions (1.6)
- Find break-even points symbolically and using a graph (1.1, 1.6)
- Interpret break-even points in the context of an application (1.1, 1.6)
- Find equilibrium points symbolically and using a graph (1.6)
- Interpret equilibrium points in the context of an application (1.6)
- Find the composition of two or more functions (1.2)
- Express a given function as the composition of two or more functions (1.2)
- Define and list the properties of quadratic functions (2.1)
- Graph quadratic functions by hand and using computer software (2.2)
- Use quadratic functions to analyze and solve business application problems (2.3)
- Find break-even and equilibrium points symbolically and interpret them in the context of the application (2.1, 2.3)
- Find maximum and minimum points of interest for quadratic functions (2.2, 2.3)
- Know the definition of a polynomial function and the properties of its graph (2.4)
- Know the definition of a power function and the properties of its graph (2.4)
- Be able to graph and explain a horizontal and vertical shift of a power function (2.4)
- Know the domain of the different power functions (2.4)
- Know the definition of a rational function and the properties of its graph (2.4)
- Find the domain of a rational function (2.4)
- Graph rational functions using computer software (2.4)
- Graph piecewise functions (2.4)
- Fit curves to data using software and properties of the function (2.5)

**Unit 2:** In this unit, you will study using matrices in business applications, and solve linear programming problems using graphs and using the simplex method.

**Unit 2 Outcomes:** You will:

- Define matrices, order, a square matrix, and equal matrices (3.1, 3.2)
- Define and find the sum of two matrices (3.1)
- Define and perform scalar multiplication with matrices (3.1)
- Solve systems of equations using matrices and row reducing (3.3)
- Row reduce using computer software (3.3)
- Interpret row reduced matrices and state the solutions (3.3)
- Solve systems of inequalities (4.1)
- Graphically solve linear programming problems using computer software (4.2)
- Interpret the solution to linear programming problems in the context of the problem (4.2)
- Use the simplex method and computer software to solve linear programming problems including application problems (4.3, 4.4, 4.5)

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**Unit 3:** In this unit, you will study exponential and logarithmic functions, the use of these functions as they apply to business applications, and the mathematics of finance

**Unit 3 Outcomes:** You will:

- Know the definition of an exponential function and the properties of its graph (5.1)
- Be able to graph and explain a reflection of an exponential function (5.1)
- Solve application problems involving exponential equations symbolically and using computer software (5.3)
- Know the definition of a logarithmic function and the properties of its graph (5.2)
- Be able to graph and explain a reflection of a logarithmic function (5.2)
- Graph logarithmic and exponential functions using computer software (5.1, 5.2)
- Find and interpret the solutions of application problems involving logarithmic equations (5.3)
- Find and interpret the solutions of application problems involving simple interest formulas (6.1)
- Find and interpret the solutions of application problems involving compound interest formulas (6.2)
- Find and interpret the solutions of application problems involving the future value of an ordinary annuity formula (6.3)
- Find and interpret the solutions of application problems involving the present value of an ordinary annuity formula (6.4)
- Find and interpret the solutions of application problems involving loans and amortization formula (6.5)

***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 group project 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.)

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**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. All the homework assignments are in the homework assignment packet. There is one packet for each unit. Homework may be online (see Required Materials) and may be graded.
- 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 be in the back of the text or in 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.

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***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:

- Brookdale's Academic Integrity Code
- Student Conduct Code
- Student Grade Appeal Process

Please refer to the **BCC STUDENT HANDBOOK AND BCC 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 Disabilities 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***:

- Mental Health Crisis Support: From a campus phone, dial 5555 or 732-224-2329 from an external line; off-hours calls will be forwarded to BCC police (2222 from a campus phone)
- Psychological Counseling Services: 732-224-2986 (to schedule an appointment during regular hours)

*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 arises.*