MIDDLESEX COLLEGE, Edison, New Jersey

Master Syllabus

**Course ID and Name**: MAT 139, Precalculus for Business and Economics

**Department**: Mathematics

**Prerequisite:** Algebra II, MAT 014, or the equivalent demonstrated through multiple measures

**Co-requisite**: None

**Course Description:** This course includes the algebraic concepts necessary for future studies in business and economics. Topics include linear and quadratic functions, exponential, logarithmic, and trigonometric functions, systems of linear equations and inequalities, and matrix algebra methods.

**General Education Status: GE MST**

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

**Textbook(s) and Other Course Materials**:

E-book: Algebra and Trigonometry

OpenStax

https://openstax.org/details/books/algebra-and-trigonometry

Online Software: MyOpenMath

Supplies: TI 84, TI 83Plus, or TI Inspire Graphing Calculator required.

**Core Learning Outcomes**:  
Upon successful completion of the course, the student will be able to:

1. Use appropriate mathematical and statistical concepts and operations to interpret data and to

solve problems.

a. Translate quantifiable problems into mathematical terms and solve these problems using mathematical or statistical operations.

b. Construct graphs and charts, interpret them, and draw appropriate conclusions.

1. Communicate accurate mathematical terminology and notation to explain strategies to solve

problems and interpret solutions.

1. Use technology correctly to solve mathematical problems.
2. Analyze and utilize the language of algebra, as well as the formal and mathematical definitions that accompany them

**Course Content Areas:**

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| **Content Strands** | **Students will be able to…** |
| Functions  (CLO 1, 2, 3, 4) | * Understand the definitions of relation, function, domain, and range. * Read the graph of a function to obtain vital information * Understand and appropriately use function notation. * Perform transformations on graphs of elementary functions. * Perform algebraic operations on, and compositions of functions. * Find the inverse of a one-to-one function. |
| Linear and Quadratic Functions  (CLO 1, 2, 3, 4) | * Graph linear functions and interpret their slopes. * Solve problems involving the average rate of change. * Simplify a difference quotient for linear and quadratic functions. * Graph absolute value functions with linear arguments. * Graph quadratic functions. * Identify the vertex of a parabola as being a maximum or a minimum. * Solve problems involving break-even analysis (profit/revenue/cost) using linear and quadratic functions. * Solve problems involving supply and demand using linear and quadratic functions. |
| Exponential, Logarithmic, and  Trigonometric Functions  (CLO 1, 2, 3, 4) | * Graph exponential functions. * Switch between exponential and logarithmic representation of an equation. * Evaluate logarithms without a calculator. * Use basic properties of logarithms to evaluate expressions. * Solve exponential and logarithmic equations. * Solve problems involving simple interest and compound interest. * Solve problems which arise in annuities and sinking funds using exponential functions. * Evaluate trigonometric functions of special acute angle measures. * Solve problems related to right triangles. * Convert between degree and radian measure. * Graph trigonometric functions. * Solve trigonometric equations using an inverse function. |
| Systems of Linear Equations and  Linear Inequalities  (CLO 1, 2, 3, 4) | * Solve a system of linear equations in two variables using graphing, substitution, or elimination. * Solve a system of linear equations in three variables using substitution or elimination. * Graph a system of linear inequalities in two variables. * Solve linear programming problems that may arise in the business world using the graphs of linear inequalities in two variables. * Solve simple linear programming problems using the simplex method. |
| Matrix Algebra  (CLO 1, 2, 3, 4) | * Use elementary row operations to find row-equivalent matrices. * Solve a system of linear equations in n variables using Gauss-Jordan elimination. * Perform arithmetic operations on matrices, including multiplication. * Find the determinant of a 2x2 or 3x3 matrix. * Find the inverse of a 2x2 or 3x3 matrix and use it to solve a system of linear equations. * Solve systems of linear equations using Cramer’s Rule. * Solve problems that utilize the Leontif Input-Output model. |

**Policies**:

Disability Support: Students with disabilities, whether physical, learning or psychological, who believe that they may need accommodations in this class, are encouraged to contact Disability Services as soon as possible to ensure that the accommodations are implemented.  Please meet with the Disability Services staff in Edison Hall, Room 100, (732) 906-2546.

Code of Student Conduct: To foster a productive learning environment, the College requires that all students adhere to the Code of Student Conduct which is published in the college catalog and website.