Course goals: This course is designed to prepare students for MAC 1140 or MAC 1147. Content includes: reviewing real and complex numbers, solving various types of equations, graphing basic functions, and exploring exponential and logarithmic functions. The course goals are broken down into two categories:

I) *Core Modules:* The necessary concepts and skills required for success in MAC 1140 or MAC 1147. These Modules cover:

1. Real and Complex Numbers
2. Linear Functions
3. Linear Inequalities
4. Quadratic Functions
5. Radical Functions
6. Polynomial Functions
7. Rational Functions
8. Logarithmic and Exponential Functions

This represents the necessary concepts and skills of College Algebra. After a review of the types of numbers we will encounter in the course, each Module explores a particular class of functions. Objectives for each Module are listed on the next page.

II) *Advanced Modules:* Preparation for how concepts in this course can be used in various academic paths. These Modules will prepare you for Calculus or Biological Sciences.

A) This set is designed to prepare you for the first concept you will encounter in Calculus: Limits.

B) This set is designed to prepare you for modeling real-life phenomena using functions we explored in the Core Modules.

These sets build on the types of functions we explored in the Core Modules. They capture the two most common reasons students take MAC 1105. Students will only work on one of the two tracks. Objectives for each Module are listed on the last page.

Core Modules

Module 1 - Real and Complex Numbers

- *Identify the subgroup of Real numbers a number belongs to.*
- *Identify the subgroup of Complex numbers a number belongs to.*
- *Apply the properties of Real numbers to simplify large expressions.*
- *Generalize the properties of the Real numbers to Add/Subtract/Multiply/Divide Complex numbers.*

Module 2 - Linear Functions

- *Construct linear functions using various information about the function.*
- *Translate between different forms (Point-Slope, Slope-Intercept, Standard) of a linear function.*
- *Translate between representations (equation, graph, description) of a linear function.*
- *Solve linear equations.*

Module 3 - Linear Inequalities

- *Translate between a written description and interval notation for linear inequalities.*
- *Convert between linear inequalities, graphs of linear inequalities, and their interval notation.*
- *Solve linear inequalities.*

Module 4 - Quadratic Functions

- *Construct quadratic functions using various information about the function.*
- *Translate between representations (equation, graph, description) of a quadratic function.*
- *Translate between different forms (Vertex, Standard, and Factored) of a quadratic function.*
- *Solve quadratic equations.*

Module 5 - Radical Functions

- *Identify the domain of a radical function.*
- *Translate between representations (equation, graph, description) of a radical function.*
- *Solve radical equations.*

Module 6 - Polynomial Functions

- *Identify the end behavior of a polynomial function (in factored form).*
- *Identify the zero behaviors of a polynomial function (in factored form).*
- *Translate between representations (equation, graph, description) of a polynomial function.*
- *Construct lowest-degree polynomial functions given their zeros.*

Module 7 - Rational Functions

- *Identify the domain of a rational function.*
- *Translate between representations (equation, graph, description) of a rational function.*
- *Solve rational equations.*

Module 8 - Logarithmic and Exponential Functions

- *Identify the domain/range of logarithmic or exponential functions.*
- *Translate between different forms (logarithmic and exponential) of an equation.*
- *Utilize the properties of logarithmic functions to solve logarithmic equations.*
- *Solve exponential equations with same or different bases.*

Advanced Modules

Calculus This set is designed to prepare you for the first concept you will encounter in Calculus: Limits.	**Biological Sciences** This set is designed to prepare you for modeling real-life phenomena using functions we explored in the Core Modules.
A9 – Operations on Functions • *Identify the domain after operating (+ − , x , ÷) on functions.* • *Evaluate the composition of two functions.* • *Recognize whether a function is 1-1 or not.* • *Solve for the inverse of a function, if it exists.*	**B9 – Modeling with Linear Equations** • *Identify when a real-world situation would require a linear function.* • *Describe the domain on which the model is valid.* • *Construct a linear model equation for the real-life situation.*
A10 – Synthetic Division • *Apply synthetic division to divide two polynomials.* • *Describe the possible rational or integer roots of a polynomial.* • *Apply synthetic division to completely factor a polynomial.*	**B10 – Modeling with Power Equations** • *Identify when a real-world situation would require a direct variation equation.* • *Identify when a real-world situation would require an inverse variation equation.* • *Construct a power model equation for the real-life situation.*
A11 – Introduction to Limits • *Describe what the limit of a function represents.* • *Evaluate the left or right limit of a function.* • *Evaluate the limit of a function.*	**B11 – Modeling with Log or Exponential Equations** • *Identify when a real-world situation would require a logarithmic function.* • *Identify when a real-world situation would require an exponential function.* • *Construct a log/exp model equation for the real-life situation.*
A12 – Graphing Rational Functions • *Use limits to determine the holes of a rational function.* • *Use limits to determine the vertical asymptotes of a rational function.* • *Use limits to describe the horizontal asymptotes of a rational function.* • *Use limits to describe the oblique asymptotes of a rational function.*	**B12 – Solving Real-World Modeling Word Problems** • *Determine the appropriate type of function to model the situation.* • *Construct a model equation for the real-life situation.* • *Solve the real-world modeling problem.*