

UNIVERSITY OF NORTH ALABAMA
Departmental Syllabus
MA 115 PRE-CALCULUS ALGEBRA AND TRIGONOMETRY

Course Description: This course is a one semester combination of Pre-calculus Algebra and Pre-calculus Trigonometry intended for superior students. The course covers the following topics: algebra of functions (including polynomial, rational, exponential, and logarithmic functions); systems of equations and inequalities; quadratic inequalities; the binomial theorem; the study of trigonometric and inverse trigonometric functions including extensive work with trigonometric identities and trigonometric equations; vectors; complex numbers; DeMoivre's Theorem; polar coordinates.

Credit Hours. 3

Course Textbook: *"Algebra and Trigonometry with Analytic Geometry"*, 10th ed., by Swokowski

Course Objectives:

1. The student shall demonstrate knowledge of functions, including polynomial, rational, exponential, logarithmic, trigonometric, and inverse trigonometric functions.
2. The student shall demonstrate knowledge of the sequential nature of mathematics and the interrelated nature of the various branches of mathematics.
3. The student shall demonstrate a knowledge of problem solving by reading and interpreting the problem, using mathematical models and reflecting on the reasonableness of the answer.
4. The student shall demonstrate a knowledge of working problems backwards.
5. The student shall demonstrate a knowledge of estimating making predictions and checking.
6. The student shall demonstrate a knowledge of spatial relationships, including the use of vectors and polar coordinates.
7. The student shall demonstrate a knowledge of standard mathematics vocabulary and symbols; and demonstrate an ability to use the vocabulary and symbols accurately in communication.
8. The student shall demonstrate ability to use fundamental mathematics operations, algorithms, and measurements.

9. The student shall demonstrate an ability to present and interpret data in graphical form.
10. The student shall demonstrate an ability to select or create appropriate mathematical models to solve problems in mathematics and in other disciplines.
11. The student shall demonstrate ability to integrate problem solving strategies learned in mathematics into the solution of problems encountered in daily living.
12. The student shall demonstrate an understanding of the polar representation of a complex number and DeMoivre's Theorem.

Course Content:

- I. Solving Equations and Inequalities
 1. Linear Equations
 2. Quadratic Equations and Complex numbers
 3. Other types of equations
 4. Inequalities
- II. Functions and Graphs
 1. Rectangles Coordinates System
 2. Lines
 3. Functions
 4. Quadratic Functions
 5. Operations on Functions
 6. Inverse Function
- III. Polynomial and Rational Functions
 1. Division of Polynomials
 2. Zeros of Polynomials
 3. Complex and Rational Zeros of Polynomials
 4. Rational Functions, Properties & Graphs
- IV. Exponential and Logarithmic
 1. Definition
 2. Properties
 3. Equations involving exponential and logarithmic expressions
- V. Trigonometric Functions
 1. Angles
 2. Definition
 3. Applications with right triangles
 4. Graphs
- VI. Analytic Trigonometry
 1. Verifying Identities
 2. Solving equations
 3. Special formulas
 4. Inverse functions

- VII. Applications of Trigonometry
 - 1. Law of Sines
 - 2. Law of Cosines
 - 3. Trigonometric form of complex number
 - 4. DeMoivre's Theorem
 - 5. Polar Coordinates
- VIII. Systems of Equations
 - 1. Substitution Method
 - 2. Type of Systems
 - 3. Linear Systems
- IX. The Binomial Theorem

Standard: Mathematics, at least to the pre-calculus level, including probability, statistics, statistical concepts and skills, and the use of differential equations and calculus. 290-3-3-.16(1)(c)7.

Assessment: Assessed by Exams.

Course Requirements: Regular attendance.

Course Evaluation: There will be at least four 50 minute in-class test and a comprehensive final examination.

ACCOMMODATION STATEMENT:

In accordance with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973, the University offers reasonable accommodations to students with eligible documented learning, physical and/or psychological disabilities. Under Title II of the Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973, a disability is defined as a physical or mental impairment that substantially limits one or more major life activities as compared to an average person in the population. It is the responsibility of the student to contact *Developmental Services* prior to the beginning of the semester to initiate the accommodation process and to notify instructors within the first three class meetings to develop an accommodation plan. Appropriate, reasonable accommodations will be made to allow each student to meet course requirements, but no fundamental or substantial alteration of academic standards will be made. Students needing assistance should contact *Developmental Services*.

Revised 6/06