MTH 115
Precalculus Algebra and Trigonometry

I. MTH 115 Precalculus Algebra and Trigonometry - 4 Semester Hours

II. Course Description

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

III. Prerequisite

A minimum prerequisite of high school Algebra I, Geometry, Algebra II, and Trigonometry with an appropriate mathematics placement score. An alternative to this is that the student should successfully pass with a C or higher in MTH 100 and receive permission from the department chairperson.

IV. Textbook

Due to the varied selection of quality college level textbooks, each college will select the textbook needed to meet the requirements of this course.

V. Course Objectives

The objective of this course is to provide an understanding of concepts, develop competent skills, and demonstrate applications in the following areas:

1. analytic and geometric interpretation of algebraic, exponential, and logarithmic functions
2. analytic and geometric interpretation of systems of equations and inequalities
3. circular and right triangle approaches to trigonometry
4. vectors
5. complex numbers and their relationship with trigonometry and vectors
6. polar coordinates and polar graphs

While building on the manipulative skills from algebra this course strives to develop analytic skills as a preparation for further mathematical applications or courses in mathematics requiring knowledge of algebraic and transcendental functions.

VI. Course Outline of Topics

A. This course shall include the following topics as a minimum.
   1. Cartesian plane
   2. Graphs of equations
   3. Lines in the plane
   4. Functions
   5. Graphs of functions
   6. Combinations of functions
   7. Inverse functions
   8. Variation
   9. Quadratic functions
   10. Higher degree functions
   11. Real zeros
   12. Complex numbers
   13. Fundamental Theorem of algebra
   14. Rational functions
   15. Partial fractions
   16. Exponential functions
   17. Logarithmic functions
   18. Properties of logarithms
   19. Solving exponential and logarithmic equations
   20. Applications
   21. Systems of equations
   22. Systems in two variables
   23. Systems of more than two variables
   24. Systems of inequalities
   25. Linear programming
   26. Quadratic inequalities
   27. Binomial Theorem
   28. Radian and degree measure
   29. The trigonometric functions and the unit circle
   30. Trigonometric functions and right triangles
   31. Trigonometric functions of any angle
   32. Graphs of trigonometric functions
   33. Inverse trigonometric functions
   34. Applications of trigonometry
   35. Verifying trigonometric identities
   36. Solving trigonometric equations
   37. Sum and difference formulas
38. Multiple-angle and product-sum formulas  
39. Law of sines  
40. Law of cosines  
41. Trigonometric form of a complex number  
42. DeMoivre’s Theorem and nth roots  
43. Polar coordinates  
44. Vectors  

B. Optional topics may include the following.  
1. Matrices  
2. Sequences  
3. Conic Sections  

VII. Evaluation and Assessment  

Evaluation and assessment techniques may include any or all of the following.  

Exams  
Projects  
Homework  
Computer Assignments  
Participation  

Grades will be given based upon A = 90 – 100%, B = 80 – 89%, C = 70 – 79%, D = 60 – 69%, and F = below 60%.  

VIII. Attendance  

Students are expected to attend all classes for which they are registered. Students who are unable to attend class regularly, regardless of the reason or circumstance, should withdraw from that class before poor attendance interferes with the student’s ability to achieve the objectives required in the course. Withdrawal from class can affect eligibility for federal financial aid.  

IX. Statement on Discrimination/Harassment  

The College and the Alabama State Board of Education are committed to providing both employment and educational environments free of harassment or discrimination related to an individual’s race, color, gender, religion, national origin, age, or disability. Such harassment is a violation of State Board of Education policy. Any practice or behavior that constitutes harassment or discrimination will not be tolerated.  

X. Americans with Disabilities  

The Rehabilitation Act of 1973 (Section 504) and the Americans with Disabilities Act of 1990 state that qualified students with disabilities who meet the essential functions and academic requirements are entitled to reasonable accommodations. It is the student’s responsibility to provide appropriate disability documentation to the College.