

BROOME COMMUNITY COLLEGE  
Binghamton, New York

**COURSE TITLE** ALGEBRA AND TRIGONOMETRY FOR CALCULUS **MAT 156**  
**CLASS LECTURE HOURS** 4 **LAB HOURS** 0 **CREDIT HOURS** 4  
**DIVISION DEAN** Julia Peacock  
**DEPT. CHAIRPERSON** Paul O'Heron **DATE** Spring 2004rev Spring 2005

Prerequisite: MAT 136 College Algebra and Trigonometry or equivalent.

After taking MAT 156 the student should be able to:

Perform skills in three categories: Algebra, Geometry, Trigonometry; Non Calculator Graphing; and Graphing Calculator.

Note: Throughout the course the students are expected to solve applied problems related to the topics of the course.

**Algebra, Geometry, Trigonometry Objectives:**

1. Be able to determine the horizontal, vertical and oblique asymptotes of a rational function.
2. Solve rational, polynomial, exponential, logarithmic, trigonometric equations and inequalities analytically.
3. Solve problems involving conic section formulas for a circle, parabola, ellipse, and hyperbola.
4. Find the determinant of 2 by 2 and 3 by 3 matrices by hand.
5. Solve systems of linear equations using elimination and row operations on matrices.
6. Add, subtract, multiply matrices.
7. Verify trigonometric identities involving the reciprocal identities, quotient identities, Pythagorean identities, angle sum identities, double angle identities, and half angle identities.
8. Verify inverse trigonometric identities.
9. Apply the Law of Sines to solve application problems.
10. Explain and solve the ambiguous case for the Law of Sines.
11. Apply the Law of Cosines to solve application problems.
12. Define a vector.
13. Perform vector arithmetic, including magnitude.
14. Use component vectors to solve application problems.
15. Convert between trigonometric (polar) and rectangular forms of complex numbers.
16. Introduce the concept of a limit through tabular values.

**Non Calculator Graphing Objectives:**

17. Name the equation of a transformed basic function/relation by viewing its graph.
18. Construct a graph of a rational function from its intercepts and asymptotes.
19. Graph  $y=\sin^{-1}x$ ,  $y=\cos^{-1}x$ ,  $y=\tan^{-1}x$ ,  $y=\sec^{-1}x$  on a suitable domain.
20. Graph  $\ln x$ ,  $e^x$ ,  $\log_a x$  and  $a^x$ .
21. Graph conic sections.
22. Recognize the form and graphs of basic polar equations.
23. Recognize the form and graphs of basic parametric equations.
24. Graph basic parametric equations and basic polar equations.
25. Solve systems of two linear inequalities.

**Graphing Calculator Objectives:**

26. Explain why the graphing calculator really does not draw a vertical asymptote for the function.
27. Find the real and complex zeroes of a polynomial function using the Computer Algebra System.
28. Use DeMoivre's Theorem to compute powers and roots of complex numbers in trigonometric (polar) and rectangular forms using the Computer Algebra System.
29. Perform the partial fraction decomposition of a rational expression using the Computer Algebra System.
30. Solve equations and inequalities with rational, polynomials, exponential, logarithmic, trigonometric and inverse logarithmic, trigonometric functions using the intersection method.
31. Solve equations and inequalities with rational, polynomials, exponential, logarithmic, trigonometric and inverse logarithmic, trigonometric functions using the Computer Algebra System.
32. Graph advanced polar equations and advanced parametric equations.
33. Find the determinant of 2 by 2 and 3 by 3 matrices.
34. Find solutions to system of inequalities using the shading capabilities of the calculator.

**Catalog Course Description - MAT156 Algebra and Trigonometry for Calculus**

Graphs of rational functions, asymptotes, exponential and logarithmic equations, conic sections, matrix arithmetic and matrix solutions to systems of equations, determinants, trigonometric identities and equations, Law of Sines, Law of Cosines, vectors, polar graphs, parametric graphs, polar form of complex numbers, powers and roots of complex numbers, limits of functions using tables.

4 class hours; Prerequisite: MAT 136 College Algebra and Trigonometry, or equivalent.