A. **TITLE:** PRECALCULUS

B. **COURSE NUMBER:** MATH 123

C. **CREDIT HOURS:** 4

D. **WRITING INTENSIVE COURSE:** N/A

E. **COURSE LENGTH:** 15 weeks

F. **SEMESTER(S) OFFERED:** Spring and Fall semesters

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   Four hours per week

H. **CATALOG DESCRIPTION:** This course provides an intense study of topics which are fundamental to the study of Calculus. Emphasis is placed on functions and their graphs with special attention to polynomial, rational, exponential, logarithmic and trigonometric functions, and analytic trigonometry. Additional topics include complex numbers; systems of equations and inequalities; trigonometric identities; and trigonometric applications.

I. **PRE-REQUISITES:** Intermediate Algebra (MATH 106) with a grade of C or better, or 2 high school regents math courses with a grade of 75 or above on the second New York State Regents mathematics examinations, or permission of instructor. Cannot be taken for credit by students with credit in College Algebra and Trigonometry (MATH 121).

J. **GOALS (STUDENT LEARNING OUTCOMES):** By the end of the course students will be able to:

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<th>Course Objective</th>
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| a. Solve linear, polynomial, and rational equations/inequalities as well as absolute value, radical, exponential, and logarithmic equations | 1. Communication  
2. Critical Thinking |
| b. Graph functions and find zeros, domains, ranges, inverses, and perform algebraic operations and composition of functions | 1. Communication  
2. Critical Thinking |
| c. Find trigonometric function values and convert between angle measures           | 1. Communication  
2. Critical Thinking |
| d. Solve right and oblique triangles                                               | 1. Communication  
2. Critical Thinking |
| e. Use Pythagorean, sum, difference, half angle, and double angle identities to simplify or evaluate trigonometric expressions and prove identities | 1. Communication  
2. Critical Thinking |
| f. Analyze graphs of transformed sine and cosine functions                          | 1. Communication  
2. Critical Thinking |

L. **REFERENCES:** Many materials in the Math Lab and online will aid the students with mastery of this subject

M. **EQUIPMENT:** A calculator will be required for portions of this course.

N. **GRADING METHOD:** A-F

O. **MEASUREMENT CRITERIA/METHODS:**
   - Homework
   - Quizzes
   - Exams
   - Projects

P. **DETAILED COURSE OUTLINE:**

I. Graphs Functions and Models
   1. Functions and graphs
   2. Slope of a line segment and equations of lines
   3. Special cases: vertical and horizontal lines
   4. The algebra of functions
   5. Symmetry and transformations of functions

II. Functions, Equations, and Inequalities
   1. Linear equations
   2. Complex numbers
   3. Quadratic functions and equations
   4. Analyzing graphs of quadratic functions
   5. Rational equations and equations involving absolute value
   6. Linear inequalities

III. Polynomial Functions and their Graphs
   1. Introduction to polynomial functions
   2. Graphs of polynomials
   3. Polynomial division
   4. Fundamental Theorem of Algebra and Rational Root Theorem
   5. Polynomial Inequalities
   6. Rational Inequalities

IV. Exponential and Logarithmic Functions
   1. Inverse functions
   2. General exponential functions and the number $e$
   3. Logarithmic functions
   5. Exponential and logarithmic equations
   6. Exponential models for growth and decay
V. Trigonometric Functions
   1. Trigonometric functions of acute angles
   2. Solving right triangles
   3. Trigonometric functions of any angle
   4. Radians and arc length
   5. Graphs of trigonometric functions
   6. Graphs of transformed sine and cosine functions

VI. Trigonometric Identities
   1. Pythagorean, sum and difference identities
   2. Co-function, double angle and half angle identities
   3. Proving identities

VII. Applications of Trigonometry
   1. Law of Sines
   2. Law of Cosines

Q. LABORATORY OUTLINE: N/A