

**SUFFOLK COUNTY COMMUNITY COLLEGE
COLLEGE-WIDE COURSE SYLLABUS
MAT129**

I. COURSE TITLE:
College Precalculus

II. CATALOG DESCRIPTION:

A comprehensive analysis of fundamental Precalculus concepts for students planning to enter the calculus sequence. Topics include a thorough presentation of functions with an emphasis on quadratic, polynomial, rational, trigonometric, inverse trigonometric, exponential, and logarithmic functions; solutions to equations and inequalities, trigonometric identities; conic sections; and applications. Prerequisite: C or better in MAT120 or placement.

A-E-G / 4 credit hours

III. COURSE GOALS:

- A. Expose students to a variety of elementary functions.
- B. Develop methods of trigonometry, geometry, and analytic geometry needed for calculus and physics.
- C. This course satisfies the SUNY general education requirement for mathematics.

IV. COURSE OBJECTIVES:

Upon successful completion of this course, students will be able to:

- A. Define a function and describe the domain and range of symmetric, composite, and inverse functions;
- B. Solve trigonometric equations and applications involving a triangle;
- C. Find and sketch the graph of trigonometric, quadratic, polynomial, rational, exponential, and logarithmic functions;
- D. Apply properties of a quadratic function to solve real-world problems;
- E. Distinguish the real and complex zeros of a function;
- F. Identify curves of conic sections and their properties.

V. OUTLINE OF TOPICS:

Topic	Approximate Time (including examinations)
A. Concept of a Function <ul style="list-style-type: none"> 1. Domain and range 2. Definition of a function and graph of a function, the vertical line test, functional notation, algebra of functions 3. Composite function 4. Find and state the domain of a composite function 5. Define a one-to-one function and the horizontal line test 6. Find an inverse function algebraically 7. Domain and range of the inverse function 8. Graph the function and its inverse using reflection 	1.5 weeks

9. Transformations of graphs and their symmetries (even, odd)	
B. Properties of Functions <ol style="list-style-type: none"> Increasing, decreasing, or constant behavior Local minimum and maximum Absolute maximum and minimum Find the secant line - the difference quotient 	0.5 week
C. Standard Functions and Their Graphs <ol style="list-style-type: none"> Constant, identity, and linear Square and cube Square root and cube root Reciprocal and absolute value Piece-wise defined Greatest integer 	0.5 week
D. Trigonometric Functions <ol style="list-style-type: none"> Angles <ol style="list-style-type: none"> Degree and radian measure Standard reference angles Unit circle trigonometry <ol style="list-style-type: none"> Define the six trigonometric functions Pythagorean Theorem - distance formula Definition of a periodic function and periodic properties of trigonometric functions Trigonometric identities <ol style="list-style-type: none"> Pythagorean, reciprocal, quotient Sum and difference of two angles Double and half-angle Graphs of trigonometric functions (include transformations) <ol style="list-style-type: none"> Domain and range Amplitude, period, and frequency Arcsine, arccosine, and arctangent <ol style="list-style-type: none"> Domain and range Evaluate expressions and compositions involving inverse trigonometric functions Inverse trigonometric functions and graphs Solve trigonometric equations 	4 weeks
E. Applications of Trigonometry <ol style="list-style-type: none"> Right triangle trigonometry Oblique triangles: Law of Sines and Law of Cosines 	1 week
F. Quadratic Functions <ol style="list-style-type: none"> Domain and range Axis of symmetry Zeros of a quadratic function - intercepts Vertex – minimum/maximum value Graph a quadratic function Applications Properties of the discriminant 	1 week

<p>G. Polynomial Functions</p> <ol style="list-style-type: none"> 1. Sum, difference, product, quotient of two polynomial functions, and their domains 2. Zeros of a polynomial function and their multiplicities 3. Fundamental Theorem of Algebra; complex zeros 4. Factor and Remainder Theorems 5. Power functions and end behavior 6. Graph a polynomial function 7. Solve polynomial inequalities in one variable <ol style="list-style-type: none"> a. Graph the solution set on a number line b. Write the solution set in interval and set builder notation 	<p>2 weeks</p>
<p>H. Rational Functions</p> <ol style="list-style-type: none"> 1. Domain and range 2. Proper and improper rational functions 3. Intercepts 4. Vertical asymptotes and holes 5. Horizontal and oblique asymptotes 6. Graph a rational function 7. Solve rational inequalities in one variable <ol style="list-style-type: none"> a. Graph the solution set on a number line b. Write the solution set in interval and set builder notation 	<p>1.5 weeks</p>
<p>I. Exponential and Logarithmic Functions</p> <ol style="list-style-type: none"> 1. Find the inverse function analytically 2. Domain and range of the inverse function 3. Intercepts 4. Asymptotes 5. Graph a function and its inverse using reflection <ol style="list-style-type: none"> a. Translations 	<p>1 week</p>
<p>J. Analytic Geometry</p> <ol style="list-style-type: none"> 1. Parabola, circle, ellipse, and hyperbola <ol style="list-style-type: none"> a. Standard and general forms of the equations b. Vertex/vertices, center, major/minor axes, asymptotes c. Graph to identify the type of conic section 	<p>1 week</p>
<p>K. Review and Cumulative Final Examination</p>	<p>1 week</p>

VI. Evaluation of Student Performance:

To be determined by the instructor

VII. Resources:

Precalculus Enhanced with Graphing Utilities (8th edition), Sullivan & Sullivan
Pearson, 2021

VIII. Programs that require this course:

A.A.S. Electrical Tech, A.A. Adolescence Ed Math

IX. Courses that require this course as a prerequisite: MAT141

X. Courses that require this course as a corequisite: none

XI. Tutoring and Supportive Resources at [SCCC](#)