

MATH 27 Course Outline as of Fall 2018

CATALOG INFORMATION

Dept and Nbr: MATH 27            Title: PRECALC ALG AND TRIG  
Full Title: Precalculus Algebra and Trigonometry  
Last Reviewed: 3/14/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	5.00	17.5	Lecture Scheduled	87.50
Minimum	5.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 175.00

Total Student Learning Hours: 262.50

Title 5 Category: AA Degree Applicable  
Grading:            Grade Only  
Repeatability:    00 - Two Repeats if Grade was D, F, NC, or NP  
Also Listed As:  
Formerly:         MATH 57

**Catalog Description:**  
College algebra and trigonometry topics, including analytic geometry, functions and their graphs, trigonometric functions of angles, trigonometric identities, trigonometric solution of triangles, polar coordinates, parametric equations, complex numbers, vectors, sequences and series.

**Prerequisites/Corequisites:**  
Completion of MATH 154 or MATH 155 or higher; or Qualifying Placement from Math Assessment.

See Student Success & Assessment Services for more information about the assessment process.

**Recommended Preparation:**

**Limits on Enrollment:**

**Schedule of Classes Information:**  
Description: College algebra and trigonometry topics, including analytic geometry, functions and their graphs, trigonometric functions of angles, trigonometric identities, trigonometric

solution of triangles, polar coordinates, parametric equations, complex numbers, vectors, sequences and series. (Grade Only)

Prerequisites/Corequisites: Completion of MATH 154 or MATH 155 or higher; or Qualifying Placement from Math Assessment.

See Student Success & Assessment Services for more information about the assessment process.

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>		Effective:	Inactive:
	B	Communication and Analytical Thinking	Fall 1981	
	MC	Math Competency		
<b>CSU GE:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 1996	
	B4	Math/Quantitative Reasoning	Fall 1981	Spring 1984
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 1998	
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:
<b>UC Transfer:</b>	Transferable	Effective:	Fall 1998	Inactive:

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

**Outcomes and Objectives:**

During this course, students will:

1. Perform advanced operations with functions (using symbolic, graphical, and numerical representations) and apply knowledge to application and modeling problems.
2. Define and graph inverse functions.
3. Define and apply the trigonometric functions, using both right triangle and unit circle approaches, and using both degree and radian measure.
4. Identify and interpret characteristics of functions (including intercepts, turning points, extreme values, intervals of positive/negative/increasing/decreasing value, transformations, symmetry, asymptotes, holes) in graphing polynomial, rational, absolute value, radical, exponential, logarithmic, trigonometric, and inverse trigonometric functions.
5. Verify and apply trigonometric identities.
6. Solve equations symbolically and graphically (involving polynomial, rational, absolute value, radical, exponential, logarithmic, and trigonometric functions) over the real numbers; and, as appropriate, the complex numbers.
7. Solve application and modeling problems using the trigonometric functions, identities, and the

- Laws of Sines and Cosines.
8. Represent complex numbers in, and perform operations using, trigonometric form.
  9. Graph circles, piecewise-defined functions, and parametric equations.
  10. Use vectors to model applications in mathematics and science.

## **Topics and Scope:**

### **I. Equations and Inequalities**

- A. Graphical and algebraic solutions to radical and quadratic form equations, and to absolute value equations and inequalities
- B. Solutions to systems of nonlinear equations

### **II. Topics from Analytic Geometry**

- A. Midpoint and distance formulas
- B. Circles

### **III. Analysis of Functions and Their Graphs**

- A. Definition
- B. Notation
- C. Domain
- D. Range
- E. Operations, including difference quotients and composition of functions
- F. Catalog of functions
- G. Symmetry
- H. Even and odd functions
- I. Shifts
- J. Scaling
- K. Reflections
- L. Modeling

### **IV. Polynomial and Rational Functions**

- A. Linear, quadratic, polynomial functions of higher degree and their graphs
- B. Long division of polynomials
- C. Graphs of rational functions
- D. Asymptotes and holes
- E. Introduction to limit concepts and notation
- F. Solutions of polynomial and rational equations and inequalities, using real numbers and complex numbers as appropriate

### **V. Inverse, Exponential, and Logarithmic Functions**

- A. Definitions
- B. Properties
- C. Graphs
- D. Equations
- E. Applications

### **VI. Trigonometric Functions**

- A. Radian and degree measures of angles
  1. Arc length
  2. Area of a sector
  3. Linear and angular velocity
- B. Right triangle and unit circle definitions
- C. Characteristics of trigonometric functions

### **VII. Identities and Conditional Equations**

- A. Fundamental identities
- B. Sum and difference identities
- C. Related identities and their derivations

- D. Conditional trigonometric equations and applications
- VIII. Graphical Representation of Trigonometric Functions
  - A. Amplitude
  - B. Reflections
  - C. Period
  - D. Phase (horizontal) shift
  - E. Vertical shifts
- IX. Inverse Trigonometric Functions
  - A. Definitions
  - B. Properties of inverse trigonometric functions
  - C. Inverse trigonometric functions and their graphs
- X. Solutions of Triangles
  - A. Right triangles
  - B. Oblique triangles
  - C. Laws of Sines and Cosines
  - D. Applications
- XI. Complex Numbers, Polar Coordinates, and Parametric Equations
  - A. Definitions
  - B. Operations
  - C. Graphical representation of complex numbers
  - D. DeMoivre's Theorem
  - E. Polar coordinates
  - F. Parametric equations
- XII. Two Dimensional Vectors
  - A. Geometric and analytic definitions
  - B. Algebra of vectors
  - C. Trigonometric form of vectors
  - D. Dot product
  - E. Applications
- XIII. Sequences and Series
  - A. Finite and infinite geometric sequences and series
  - B. Summation of powers of integers

### **Assignment:**

1. Daily reading outside of class (30-60 pages per week)
2. Homework assignments (1-4 per week)
3. Quizzes (0-4 per week)
4. Exams (3-8)
5. Projects (0-10)
6. Final exam

### **Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments

Problem solving  
5 - 20%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes, exams, and final exam

Exams  
70 - 95%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Projects

Other Category  
0 - 10%

### **Representative Textbooks and Materials:**

Precalculus: Enhanced with Graphing Utilities. 7th ed. Sullivan, Michael and Sullivan III, Michael. Pearson. 2016

Precalculus. 3rd corrected ed. Stitz, Carl and Zeager, Jeffrey. Open Source Text. 2013 (classic)