MATH 27 Course Outline as of Fall 2022

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	6.00	Lecture Scheduled	6.00	17.5	Lecture Scheduled	105.00
Minimum	6.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 210.00   Total Student Learning Hours: 315.00

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:
In this course, students will study topics from college algebra and trigonometry, including equations, expressions, functions, inverse functions, and graphs. Topics will also include polar coordinates, parametric equations, complex numbers, vectors, and sequences and series. Taking this course is the equivalent to taking the combination of MATH 25 and MATH 58.

Prerequisites/Corequisites:
Completion of MATH 156 or MATH 154 or MATH 155 or AB705 placement into Math Tier 3 or higher

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
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series. Taking this course is the equivalent to taking the combination of MATH 25 and MATH 58. (Grade Only)

Prerequisites/Corequisites: Completion of MATH 156 or MATH 154 or MATH 155 or AB705 placement into Math Tier 3 or higher

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;UC.

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

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

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

CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:

UC Transfer:	Transferable	Effective:	Fall 1998	Inactive:

CID:

Certificate/Major Applicable:

Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Perform advanced operations with functions (polynomial, rational, absolute value, radical, exponential, and logarithmic), understand the characteristics and graphs of these functions, and apply knowledge to modeling problems.
2. Solve selected algebraic equations symbolically over the complex numbers, and solve polynomial, rational, absolute value, radical, exponential, and logarithmic equations graphically and symbolically over the real numbers.
3. Define and graph the six trigonometric functions and their inverses, solve equations involving trigonometric functions symbolically and graphically, and verify trigonometric identities.
4. Use trigonometric functions, identities, and Laws of Sines and Cosines to solve applications problems.
5. Define, graph, and demonstrate appropriate applications of vectors, complex numbers, polar coordinates, parametric equations, and inverse functions.

Objectives:
At the conclusion of this course, the student should be able to:

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 right triangle and unit circle approaches, and using degree and radian measures.
4. Identify and interpret characteristics of functions (including intercepts, turning points, extreme values, intervals of positive/negative/increasing/decreasing value, transformations, symmetry, asymptotes, and holes).
5. Graph polynomial, rational, absolute value, radical, exponential, logarithmic, trigonometric, and inverse trigonometric functions.
6. Verify and apply trigonometric identities.
7. 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.
8. Solve application and modeling problems using the trigonometric functions, identities, and the Laws of Sines and Cosines.
9. Represent complex numbers in trigonometric form and perform operations.
10. Graph piecewise-defined functions and parametric equations.
11. 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
   B. Graphical and algebraic solutions to absolute value equations and inequalities
II. 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 (even and odd functions)
   H. Transformations of graphs (shifts, scaling, reflections)
   I. Modeling
III. Polynomial and Rational Functions
   A. Linear, quadratic, and 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
IV. Inverse, Exponential, and Logarithmic Functions
   A. Definitions
   B. Properties
   C. Graphs
   D. Equations
   E. Applications
V. 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

VI. Identities and Conditional Equations
A. Fundamental identities
B. Sum and difference identities
C. Related identities and their derivations
D. Conditional trigonometric equations and applications

VII. Graphical Representation of Trigonometric Functions
A. Amplitude
B. Reflections
C. Period
D. Phase (horizontal) shift
E. Vertical shifts

VIII. Inverse Trigonometric Functions
A. Definitions
B. Properties
C. Graphs

IX. Solutions of Triangles
A. Right triangles
B. Oblique triangles
C. Laws of Sines and Cosines
D. Applications

X. 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

XI. Two Dimensional Vectors
A. Geometric and analytic definitions
B. Algebra of vectors
C. Trigonometric form of vectors
D. Dot product
E. Applications

XII. Sequences and Series
A. Introduction to finite and infinite sequence and series (sigma) notation
B. Finite and infinite geometric sequences and series
C. Summation of powers of integers
D. Binomial Expansion
1. Factorial notation
2. Pascal's Triangle and/or binomial coefficients

Assignment:

1. Reading outside of class (0-60 pages per week)
2. Problem sets (1-8 per week)
3. Quiz(zes) (0-4 per week)
4. Project(s) (0-10)
5. Exams (3-8)

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.

Problems sets	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.

Exams and quizzes	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. 8th ed. Sullivan, Michael and Sullivan III, Michael. Pearson. 2021
Precalculus. 3rd corrected ed. Stitz, Carl and Zeager, Jeffrey. Open Source Text. 2013 (classic)