# Course Outline

**2026-2027 Catalog**

## MATH 28 - Precalculus

### Catalog Description

**Transfer Status:** CSU/UC

**Prerequisite:** Trigonometry or equivalent

**Unit(s):** 4.00

**Lecture:** 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)
**Activity:** 68.00 Contact hours/34.00 Out of class hours/102.00 Total hours/2.00 Unit(s)
**Total:** 102.00 Contact hours/102.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

**Course Description:** This course is preparation for calculus. It covers advanced algebra topics beyond the scope of Intermediate Algebra as well as the theory and applications of Trigonometry, both of which are necessary for success in calculus. Topics include polynomial, absolute value, radical, exponential, logarithmic, and trigonometric functions and their graphs; analytic geometry, and polar coordinates.

### Objectives

Upon successful completion of this course, the student should be able to:

1. Graph functions and relations in rectangular coordinates and polar coordinates
2. Synthesize results from the graphs and/or equations of functions and relations
3. Apply transformations to the graphs of functions and relations
4. Recognize the relationship between functions and their inverses graphically and algebraically
5. Solve and apply equations including rational, linear, polynomial, exponential, absolute value, radical, and logarithmic, and solve linear, nonlinear, and absolute value inequalities
6. Solve systems of equations and inequalities
7. Apply functions to model real world applications
8. Identify special triangles and their related angle and side measures
9. Evaluate the trigonometric function of an angle given in degree and radian measure
10. Manipulate and simplify a trigonometric expression
11. Solve trigonometric equations, triangles, and applications
12. Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs
13. Prove trigonometric identities

### Course Content

**Topic Titles / Suggested Time Topic**

**Lecture/Activity**

| Topics | Lec Hrs | Act Hrs |
|---|---|---|
| Functions including linear, polynomial, rational, radical, exponential, absolute value, logarithmic, trigonometric; definitions, evaluation, domain, range | 5.00 | 10.00 |
| Inverses of functions | 2.00 | 4.00 |
| Algebra of functions | 2.00 | 4.00 |
| Graphs of functions including asymptotic behavior, intercepts, and vertices | 2.00 | 4.00 |
| Transformations of quadratic, absolute value, radical, rational, logarithmic, exponential functions | 2.00 | 4.00 |
| Equations including rational, linear, radical, polynomial, exponential, trigonometric, logarithmic, and absolute value | 5.00 | 10.00 |
| Linear, nonlinear, and absolute value inequalities | 2.00 | 4.00 |
| Systems of equations and inequalities | 2.00 | 4.00 |
| Characterization of real and complex zeros of polynomials | 2.00 | 4.00 |
| Unit circle and right triangle trigonometry | 2.00 | 4.00 |
| Trigonometric and inverse trigonometric identities and formulas | 3.00 | 6.00 |
| Graphing trigonometric functions: period, amplitude, phase shift, inverse trigonometric functions | 3.00 | 6.00 |
| Polar coordinates | 2.00 | 4.00 |
| **Total Hours:** | **34.00** | **68.00** |

### Methods of Instruction

A. Class Activities
B. Collaborative Group Work
C. Homework: Students are required to complete one hour of outside-of-class homework for every two hours of activity

D. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
E. Lecture
F. Reading Assignments

## Methods of Evaluation

A. Exams/Tests
B. Quizzes
C. Homework
D. Class participation
E. Final Examination

## Examples of Assignments

**Reading Assignments**

1. Read the section in the textbook on the Law of Sines and explain when its use will lead to one, two, or no solutions.
2. Read the section in the textbook on Transformations and be able to graph functions whose equations can be derived by transforming one of the six basic functions: y = x, y =|x|, y = x^2, y = x^3, y = sqrt(x), and y = 1/x.

**Writing Assignments**

1. Given a polynomial function of degree n, explain the procedure to follow for finding its zeros. Be sure to discuss the relationship between the zeros and the x-intercepts of the function, as well as how to tell if the graph of the function crosses the x-axis or simply touches it. Further, explain how the Leading Coefficient Test can be used to describe the behavior of the function as x approaches infinity from both the left and the right.
2. Explain the procedure to follow for identifying holes and asymptotes of the graph of a rational function. Be sure to discuss how to tell if a zero of the denominator of a rational function - call it C - is the x-coordinate of a hole, or if the equation x = C is the equation of a vertical asymptote. Assume you are explaining this to a group of students hearing this for the first time and write a detailed explanation.

**Out-of-Class Assignments**

1. Review the section on Transformations and do the problems assigned by the instructor, showing your work.
2. Review the section on the Law of Sines and do the problems assigned by the instructor, showing your work.

## Recommended Materials of Instruction

Jay Abramson. (2021). Precalculus. *Openstax, 2.* https://openstax.org/details/books/precalculus-2e.
Revathi Narasimhan. (2020). Precalculus. *xyz textbooks, 2.* 978-1-63098-132-7.
Michael Sullivan. (2023). Precalculus: Concepts through functions, A unit circle approach to trigonometry. *Pearson, 5.* 9780137945139.

## Minimum Qualifications

Mathematics (Masters Required)

**Created/Revised by:** Hauser, Juliet
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