

# NC 225A: PRE-CALCULUS A

## Citrus College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Credits:	0
Total Contact Hours:	60
Lecture Hours :	60
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	120
Prerequisite:	Placement by a high school counselor.
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Non-Credit Course

## Catalog Course Description

This course covers an in-depth study of higher level functions from an algebraic approach. Students will determine intercepts, solutions, and behaviors of the following functions: quadratics, natural log, exponential, functions of higher degree and trigonometric functions. In addition, the course will go over the relationship between logarithmic and power equations discussing various properties that apply to each in order to explore the relationship between the two. The course will also cover the unit circle and trigonometry. Students will use trigonometry to solve problems dealing with right triangles, as well as non-right triangles, in order to understand how the trigonometric functions interact with each other. The course format will include investigations with hands-on activities, concepts, and applications. Course work will consist of daily homework and test/quizzes when appropriate. 60 lecture hours.

## Course Objectives

- Identify, describe, compare, and analyze linear, quadratic, exponential, logarithmic, and trigonometric functions.
- Apply concepts with vectors in 2 and 3 dimensions.
- Demonstrate manipulated trigonometric identities.
- Create and analyze mathematical models.
- Apply the rules of probability to a variety of situations.
- Apply definitions, properties, and theorems to trigonometric problem solving.
- Expand trigonometric problem solving to problems involving physical applications of trigonometry.
- Understand and apply knowledge of algebraic strategies used with trigonometry.
- Demonstrate ability to solve problems using a graphing calculator.
- Solve systems of equations.
- Apply operations with matrices.
- Identify and apply concepts such as arithmetic and geometric sequences.
- Identify and manipulate conics.

## Major Course Content

1. Polar coordinates and vectors in the plane
  - a. Translate between polar and rectangular coordinates
  - b. Interpret polar coordinates and vectors graphically
2. Complex numbers
  - a. Trigonometric form of complex numbers
  - b. Functions of a complex variable as a function of two real variables
  - c. Proof of DeMoivre's theorem
3. Proofs of formulas using mathematical induction
4. Fundamental theorem of algebra
5. Conic sections
  - a. Analytical
  - b. Geometrical
6. Quadratic equation in two variables
  - a. Standard form - complete the square and use rotations and translations
  - b. Determine what type of conic section the equation represents
  - c. Determine geometric components (foci, asymptotes, etc.)
7. Geometric description of a conic section - e.g., the locus of points whose sum of its distances from  $(1, 0)$  and  $(-1, 0)$  is 6 - and derive a quadratic equation representing it
8. Roots and poles of a rational function
  - a. Graph functions
  - b. Locate asymptotes
9. Parametric functions and equations
  - a. Graphs
10. Limit of a sequence and limit of a function as the independent variable approaches a number or infinity
  - a. Convergent and divergent sequences

## Suggested Reading Other Than Required Textbook

No other required reading

## Examples of Required Writing Assignments

No other required writing assignments

## Examples of Outside Assignments

Complete assigned problems from textbook.

## Instruction Type(s)

Lecture, Online Education Lecture