

**MATH 25 Course Outline as of Fall 2021****CATALOG INFORMATION**

Dept and Nbr: MATH 25 Title: PRECALCULUS ALGEBRA

Full Title: Precalculus Algebra

Last Reviewed: 2/8/2021

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00	Lab Scheduled	0	6	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00

Total Student Learning Hours: 210.00

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:

**Catalog Description:**

College algebra topics, including equations, expressions, functions, inverse functions, graphs, applications, complex numbers, sequences and series.

**Prerequisites/Corequisites:**

Completion of MATH 156 or MATH 154 or MATH 155 or AB705 placement into [Math Tier 3 or higher](https://assessment.santarosa.edu/understanding-your-math-placement)

**Recommended Preparation:****Limits on Enrollment:****Schedule of Classes Information:**

Description: College algebra topics, including equations, expressions, functions, inverse functions, graphs, applications, complex numbers, sequences and series. (Grade Only)

Prerequisites/Corequisites: Completion of MATH 156 or MATH 154 or MATH 155 or AB705 placement into [Math Tier 3 or higher](https://assessment.santarosa.edu/understanding-your-math-placement)

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 2006	
<b>CSU GE:</b>	<b>MC</b>	Math Competency	Fall 1981	
	<b>Transfer Area</b>		Effective:	Inactive:
	B4	Math/Quantitative Reasoning	Fall 2006	
<b>IGETC:</b>	<b>Transfer Area</b>		Effective:	Inactive:
	2A	Mathematical Concepts & Quantitative Reasoning	Fall 2006	
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 2006	Inactive:
<b>UC Transfer:</b>	Transferable	Effective:	Fall 2006	Inactive:

### **CID:**

#### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

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

1. Perform advanced operations with polynomial, rational, absolute value, radical, exponential, and logarithmic functions. Understand the characteristics and graphs of these functions and apply knowledge to modeling problems.
2. Define and graph inverse functions.
3. Solve selected algebraic equations analytically over the complex numbers, and solve polynomial, rational, absolute value, radical, exponential, and logarithmic equations graphically and analytically over the real numbers.

### **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. Identify and interpret characteristics of functions ( intercepts, turning points, extreme values, intervals of positive/negative, increasing/decreasing value, transformations, symmetry, asymptotes, and holes).
4. Graph polynomial, rational, absolute value, radical, exponential, and logarithmic functions.
5. Solve equations symbolically and graphically (polynomial, rational, absolute value, radical, exponential, and logarithmic functions) over the real numbers; and, as appropriate, the complex numbers.
6. Graph piecewise-defined functions.

7. Perform operations with complex numbers in rectangular form.

## **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. Complex Numbers**

- A. Definition
- B. Operations

### **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 (even and odd functions)
- H. Transformations of graphs (shifts, scaling, reflections)
- I. 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. 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 (2-6)
- 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.

Problem 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.

Quiz(zes), exam(s) and final exam

Exams  
70 - 95%

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

Project(s)

Other Category  
0 - 10%

## Representative Textbooks and Materials:

College Algebra. 11th ed. Sullivan, Michael. Pearson. 2020

College Algebra. 7th ed. Stewart, James and Redlin, Lothar and Watson, Saleem. Cengage L. 2016 (classic)

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