MATHEMATICS
STUDENT LEARNING OUTCOME ALIGNMENT FORM

Course Prefix/Number: MATH 2412
Course Title: Precalculus
Brief Course Description:
An overview of topics from algebra, trigonometry, and analytic geometry that are needed for calculus, including equations and inequalities, functions and inverse functions, trigonometric functions, and applications.

Foundational Component Area: Mathematics. Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.

*Choose at least one Core SLO from the Core Objective.

Core Objective	ASU SLO	Course SLO	Assignment	Assessment Method
Critical Thinking*	CT1: Gather, analyze, evaluate, and synthesize information relevant to a question or issue.	Students will evaluate transcendental functions.	Student will complete textbook or instructor-generated exercises related to evaluating transcendental functions.	Students will be assigned a score of 0 – 3 based on an assessment exam over items related to evaluating transcendental functions.
	CT2: Develop and demonstrate a logical position (i.e. perspective, thesis, hypothesis) that acknowledges ambiguities or contradictions.			
Communication*	CS1: Develop, interpret, and express ideas through effective written communication.			

	CS2: Develop, interpret, and express ideas through effective oral communication.			
	CS3: Develop, interpret, and express ideas through effective visual communication.	Students will create and interpret graphs of algebraic and transcendental functions.	Student will complete textbook or instructor-generated exercises related to graphing algebraic and transcendental functions.	Students will be assigned a score of 0 – 3 based on an assessment exam over items related to algebraic and transcendental functions.
Empirical & Quantitative Skills*	EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion.			
	EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion.	Students will use the facts, formulas, and techniques learned in this course to prove trigonometric identities, solve transcendental equations, and solve applied problems.	Student will complete textbook or instructor-generated exercises related to proving trigonometric identities and solving transcendental equations applied problems.	Students will be assigned a score of 0 – 3 based on an assessment exam over items related to trigonometric identities, transcendental equations, and applied problems.

Mathematics 2412 – Precalculus

Student Learning Outcomes

1. **The students will demonstrate an understanding of factual knowledge including the mathematical notation and terminology used in this course.** Students will read, interpret, and use the vocabulary, symbolism, and basic definitions used in precalculus pertaining to the real numbers; exponents and radicals; polynomials, factoring, and rational expressions; equations and inequalities; functions; polynomial and rational functions; inverse functions; exponential and logarithmic functions; graphs and their transformations; six trigonometric functions; types of angle measure and notation; parts of triangles and circles; parabolas, ellipses, and hyperbolas; asymptotes; and vectors.

2. **The students will describe the fundamental principles including the mathematical rules and theorems arising from the concepts covered in this course.** Students will identify and apply the laws and formulas that result directly from the definitions; for example, rules of exponents, exponential and logarithmic properties, the quadratic formula, slope and formulas for the equations of lines, the fundamental trigonometric identities, properties of angles and triangles, characteristics of the trigonometric functions and inverse trigonometric functions, formulas of the conic sections, translation of axes, and formulas relating polar and rectangular coordinates.

3. **The students will apply course material using techniques and procedures covered in this course to solve problems.** Students will utilize the facts, formulas, and the techniques learned in this course to simplify algebraic expressions; graph functions; solve equations; prove trigonometric identities; solve trigonometric equations; solve various types of triangle problems; and recognize and graph trigonometric and inverse trigonometric functions, conic sections, algebraic curves, polar equations, and parametric equations.

4. **The students will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields.** Students will acquire a level of proficiency in the fundamental concepts and applications in precalculus necessary for success in calculus.

Course Content

Textbook: *Precalculus: Functions and Graphs*, 12th Edition, by Swokowski and Cole. The following chapters including the particular sections listed are covered.

1. **Topics from Algebra:** Exponents and Radicals; Algebraic Expressions; Equations; Inequalities.

2. **Graphs and Functions:** Rectangular Coordinate Systems; Graphs of Equations; Lines; Definition of Function; Graphs of Functions; Quadratic Functions; Operations on Functions.

3. **Polynomials and Rational Functions:** Polynomial Functions of Degree Greater Than 2; Rational Functions.

4. **Inverse, Exponential, and Logarithmic Functions:** Inverse Functions; Exponential Functions; The Natural Exponential Function; Logarithmic Functions; Properties of Logarithms; Exponential and Logarithmic Equations.

5. **The Trigonometric Functions:** Angles; Trigonometric Functions of Angles; Trigonometric Functions of Real Numbers; Values of the Trigonometric Functions; Trigonometric Graphs; Additional Trigonometric Graphs; Applied Problems.

6. **Analytic Trigonometry:** Trigonometric Equations; The Addition and Subtraction Formulas; Multiple-Angle Formulas; The Inverse Trigonometric Functions.

7. **Applications of Trigonometry:** The Law of Sines; The Law of Cosines; Vectors; The Dot Product.

10. **Topics from Analytic Geometry:** Parabolas; Ellipses; Hyperbolas; Plane Curves and Parametric Equations; Polar Coordinates.