**Math 2412 – Precalculus**

**Textbook: PreCalculus 10/e**

Sullivan, Addison Wesley, 10th ed,

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**Catalog Description:**
An integrated treatment of the concepts necessary for calculus beginning with a review of algebraic and transcendental functions including trigonometric functions.  Topics also include the binomial theorem, analytic geometry, vector algebra, polar and parametric equations, mathematical induction and sequences and series.

**Course Learning Outcomes:**
The student will:

• Demonstrate and apply knowledge of properties of functions.

• Recognize and apply algebraic and transcendental functions and solve related equations.

• Apply graphing techniques to algebraic and transcendental functions.

• Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians.

• Prove trigonometric identities.

• Solve right and oblique triangles.

• Apply the binomial theorem.

• Determine equations of conic sections, and graph conics, including translation and identification of vertices, foci and asymptotes.

• Perform basic operations and solve applications using vector algebra.

• Perform operations and graph equations using polar and parametric equations.

• Prove statements using mathematical induction.

• Use properties of arithmetic and geometric sequences and series to identify terms, find sums and solve applications.

**Book Sections:**

**Chapter 2**

2.1 Functions

2.2 The Graph of a Function

2.3 Properties of Functions

2.4 Library of Functions; Piecewise-defined Functions

**Chapter 3**

3.3 Quadratic Functions and Their Properties

3.4 Build Quadratic models from Verbal Descriptions and from Data

**Chapter 5**

5.3 Exponential Functions

5.4 Logarithmic Functions

5.5 Properties of Logarithms

5.6   Logarithmic and Exponential Equations

**Chapter 6**

6.1 Angles and Their Measure

6.2 Trigonometric Functions: Unit Circle Approach

6.3 Properties of the Trigonometric Functions

6.4 Graphs of the Sine and Cosine Functions

6.5 Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions

6.6 Phase Shift; Sinusoidal Curve Fitting

**Chapter 7**

7.1 The Inverse Sine, Cosine, and Tangent Functions

7.2 The Inverse Trigonometric Functions (continued)

7.3 Trigonometric Equations

7.4   Trigonometric Identities

7.5   Sum and Difference Formulas

7.6 Double-angle and Half-Angle Formulas

7.7 Product-to-Sum and Sum-to-Product Formulas

**Chapter 8**

8.1 Applications Involving Right Triangles

8.2 Law of Sines

8.3 Law of Cosines

8.4 Area of a Triangle

**Chapter 9**

9.1 Polar Coordinates

9.2 Polar Equations and Graphs

9.4 Vectors

9.5 The Dot Product

9.6 Vectors in Space

9.7 The Cross Product

**Chapter 10**

10.2 The Parabola

10.3 The Ellipse

10.4 The Hyperbola

**Chapter 11**

11.2 Systems of Linear Equations: Matrices

11.3 Systems of Linear Equations: Determinants

11.5 Partial Fraction Decomposition

**Chapter 12**

12.1 Sequences

12.2 Arithmetic Sequences

12.3 Geometric Sequences; Geometric Series

12.4 Mathematical Induction

12.5 The Binomial Theorem