

## Mathematics 1360 – 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; and asymptotes.
- 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; solve trigonometric equations; and recognize and graph trigonometric and inverse trigonometric functions, conic sections, and algebraic curves.
- 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.

### Textbook

*Precalculus: Functions and Graphs*, Twelfth Edition, by Swokowski and Cole, Brooks/Cole, 2012.

### Course Content

Content consists of the following topics, listed according to the corresponding chapters in the text. (See textbook “Contents.”)

- 1. Topics from Algebra:** Exponents and Radicals, Algebraic Expressions, Inequalities.
- 2. Graphs and Functions:** Rectangular Coordinate System, Graphs of Equations, Lines, Definition of Function, Graphs of 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.
6. **Analytic Trigonometry:** Trigonometric Equations, The Addition and Subtraction Formulas, Multiple-Angle Formulas, The Inverse Trigonometric Functions.
10. **Topics from Analytic Geometry:** Parabolas, Ellipses, Hyperbolas, Plane Curves and Parametric Equations, Polar Coordinates.