J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: MTH 162 **Credits:** 3

Course Title: Precalculus II

Course Description: Presents trigonometry, trigonometric applications, including Law of Sines and Cosines, and an introduction to conics. Replaces MTH 164. Prerequisite: Placement in MTH 162 or completion of MTH 161 or equivalent with a grade of C or better. Credit will not be awarded for both MTH 162 and 167 or equivalent. Lecture 3 hours per week.

General Course Purpose: Designed for students preparing for the fields of business, science, technology, engineering, and mathematics with the intent to pursue further coursework in calculus and beyond with understanding of trigonometry. Students must have completed or demonstrated competency in Precalculus I.

Course Prerequisites and Co-requisites:
Prerequisite: Placement in MTH 162 or completion of MTH 161 or equivalent with a grade of C or better.

Course Objectives:
Upon completing the course, the student will be able to

1. (Trigonometric Functions)
   - Identify angles in standard form in both degree and radian format and convert from one to the other;
   - Find the arc length;
   - Find the value of trigonometric functions of common angles without a calculator using the unit circle and right triangle trigonometry;
   - Use reference angles to evaluate trig functions;
   - Find the value of trigonometric functions of angles using a calculator;
   - Use fundamental trigonometric identities to simplify trigonometric expressions;
   - Graph the six trigonometric functions using the amplitude, period, phase and vertical shifts;
   - Use trig functions to model applications in the life and natural sciences;

2. (Analytic Trigonometry)
   - Use the fundamental, quotient, Pythagorean, co-function, and even/odd identities to verify trigonometric identities;
   - Use the sum and difference, double angle, half-angle formulas to evaluate the exact values of trigonometric expressions;
   - Determine exact values of expressions, including composite expressions, involving inverse trigonometric functions;

3. (Applications of Trigonometry)
   - Solve trigonometric equations over restricted and non-restricted domains;
   - Solve right triangles and applications involving right triangles;
   - Use the Law of Sines and Cosines to solve oblique triangles and applications;

- Apply concepts of trigonometry to extended topics such as plotting polar coordinates, converting rectangular and polar coordinates from one to the other, identifying vector magnitude and direction, or performing operations with vectors such as addition, scalar multiplication, component form, and dot product;

4. (Sequences and Series)
   - Identify the terms of geometric sequences;
   - Find a particular term of geometric sequence;
   - Determine the formula for the a_n term of geometric sequences;
   - Find the sum of first n terms of finite geometric series;
   - Find the sum of infinite geometric series;

5. (Conics)
   - Identify the conic sections of various forms;
   - Write the equations of circles, parabolas, ellipses, and hyperbolas in standard form centered both at the origin and not at the origin;
   - Identify essential characteristics unique to each conic;
   - Graph equations in conic sections, centered both at the origin and not at the origin; and
   - Solve applications involving conic sections.

Major Topics to Be Included:
1. Trigonometric Functions
2. Analytic Geometry
3. Applications of Trigonometry
4. Sequences and Series
5. Conics

Effective Date of Course Content Summary: August 7, 2017