NVCC COLLEGE-WIDE COURSE CONTENT SUMMARY
MTH 164 – PRECALCULUS II (3 CR.)

COURSE DESCRIPTION

Presents trigonometry, analytic geometry, and sequences and series. (Credit cannot be awarded for both MTH 164 and MTH 166.) Lecture 3 hours per week.

GENERAL COURSE PURPOSE

The general purpose of this one-semester course is to prepare students for a course in a calculus and analytic geometry sequence by providing them with the necessary competence in trigonometry, analytic geometry, and sequences and series, as well as competency in the use of a graphing utility. At NVCC, MTH 164 is used in conjunction with MTH 163 to prepare the student for MTH 173-174 – Calculus and Analytic Geometry I – II.

ENTRY LEVEL COMPETENCIES

Prerequisite: MTH 163 – Precalculus I

COURSE OBJECTIVES

As a result of the learning experience in this course, the student should be able to:

A. Evaluate trigonometric and inverse trigonometric functions
B. Use trigonometric formulas to prove trigonometric identities, solve triangles, and trig equations
C. Graph conic sections
D. Create sequences and series (including arithmetic and geometric)
E. Use a graphing utility as an aid in problem solving

MAJOR TOPICS TO BE INCLUDED

A. Trigonometric Functions

1. Distance between two points in a plane
2. Midpoint of a line segment
3. Unit circle
4. Circular functions
   a. Definitions
   b. Simple properties (Pythagorean, Reciprocal, Complementary)
5. Formulas for \( f(x + y) \), \( f(2x) \), \( f(x/2) \)
6. Graphs of trigonometric functions
7. Inverses of trigonometric functions
8. Proving trigonometric identities
9. Solution of trigonometric equations
10. DeMoivre’s Theorem

B. Applications of Trigonometric Functions to Triangles

1. Trigonometric functions for right triangles
2. Solutions of right triangles
3. Law of Sines
4. Law of Cosines
C. Conic Sections of the form: $Ax^2 + By^2 + Cx + Dy + E = 0$

1. Parabolas
   a. Finding vertex by completing the square
   b. Graphing

2. Circles
   a. Finding center and radius by completing the square
   b. Graphing

3. Ellipses
   a. Find axes and center
   b. Graphing

4. Hyperbolas
   a. Axes and asymptotes
   b. Graphing

D. Sequences and Series

1. Definitions
2. Arithmetic Sequences and Series
3. Geometric Sequences and Series

EXTRA TOPICS (optional)

A. Mathematical Induction
B. Binomial Theorem