GROSSMONT COLLEGE

 COURSE OUTLINE OF RECORD

Curriculum Committee Approval: 04/26/2022

GCCCD Governing Board Approval: 06/14/2022

MATHEMATICS 176 – PRECALCULUS FUNCTIONS AND GRAPHS

 1. Course Number Course Title Semester Units

 MATH 176 Precalculus Functions and Graphs 6

 Semester Hours

 6 hours lecture: 96-108 hours 192-216 outside-of-class hours 288-324 total hours

 2. Course Prerequisites

A “C” grade or higher or “Pass” in Math 108 or Math 110 or equivalent or appropriate placement beyond intermediate algebra. *Note: Mathematics 103 is not equivalent to Mathematics 110*

Corequisite

None

 Recommended Preparation

 None

 3. Catalog Description

Unification of college algebra and analytical trigonometry based on the function concept. Topics include properties of real number system, inequalities, theory of equations, the study of functions including with emphasis on circular, and inverses, trigonometric identities, trigonometric equations, graphical methods, solving triangles with applications, mathematical induction, sequences and series, matrices, and binomial theorem. Passing MATH 176 is equivalent to passing both MATH 170 and MATH 175. A student will earn 6 units for passing 176 or a total of 7 units for passing both MATH 170 and MATH 175.

4. Course Objectives

 The student will:

 a. Analyze and graph linear, quadratic, polynomial, rational, exponential, logarithmic, absolute value, and trigonometric functions.

 b. Demonstrate the ability to use the techniques of analytic geometry to graph conic sections.

 c. Solve a wide variety of equations including but not limited to: linear, quadratic, polynomial, rational, radical, absolute value, exponential, logarithmic and trigonometric equations.

 d. Solve problems involving sequences and series.

 e. Illustrate translation of trigonometric functions, find the principal domain and range of the trigonometric functions.

 f. Prove trigonometric identities.

 g. Solve right triangle and oblique triangle problems, and graphing of the trigonometric functions and their variations.

 5. Instructional Facilities

 Standard classroom

 6. Special Materials Required of Student

Graphing Calculator

7. Course Content

 a. Functions and graphs including translation of graphs, combination of functions and inverse functions.

 b. Linear and quadratic functions, equations and inequalities.

 c. Polynomial and rational functions and equations including the use of the graphing calculator and synthetic division to graph.

 d. Exponential and logarithmic functions, equations and applications.

 e. Trigonometric functions developed from the unit circle using radian and degree measure.

 f. Graphs of the trigonometric functions.

 g. Applications of the trigonometric functions.

 h. Trigonometric identities.

 i. Linear models and systems of equations.

 j. Matrices and determinants.

 k. Sequence and series.

 l. Binomial theorem.

 m. Mathematical induction.

 n. Conics, parametric equations, and polar coordinates.

 o. Vectors in a plane.

 p. Introduce contributions from a diverse group of mathematicians relevant to the content of the course.

q. Application problems relevant to current events and students’ lived experiences.

 8. Method of Instruction

 Employ a variety of teaching methods, including lectures, instructor presented examples, student-led discussions, collaborative learning, think-pair-share, formative assessments (e.g. exit slips), and multimedia presentations. These instructional techniques strive to include students’ lived experiences and different cultural and historical perspectives.

 9. Methods of Evaluating Student Performance

 a. Homework

 b. Independent exploration activities such as finding the minimum surface area of a box

 c. Class participation/problem presentations

 e. Quizzes

 f. Chapter exams

 g. In-class final exam (comprehensive)

10. Outside Class Assignments

1. Homework.

 b. Take-home projects such as projectile motion using parametric equations

 c. Problem sets.

11. Representative Texts:

 a. Representative Text(s):

 Stewart, James, Lothar Redlin, Saleem Watson*. Precalculus, Mathematics for Calculus.* Boston, MA: Cengage Learning, 2016.

 b. Supplementary texts and workbooks:

 1) Student Solution Manual (optional).

 2) Graphing Calculator Manual (optional).

 Addendum: Student Learning Outcomes

Upon completion of this course, our students will be able to do the following:

1. Categorize precalculus problems and use appropriate theorems, formulas, and algorithms to solve them.
2. Use the appropriate technology to solve problems requiring precalculus.
3. Formulate, analyze, and differentiate mathematical functions numerically, graphically, and symbolically at the precalculus level and have the ability to transition between these representations.
4. Communicate the mathematical process and assess the validity of the solution.