MATH C135: PATHWAY TO CALCULUS

Item	Value
Curriculum Committee Approval Date	10/25/2024
Top Code	170100 - Mathematics, General
Units	4 Total Units
Hours	72 Total Hours (Lecture Hours 72)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	• Area 2 Mathematical Concepts and Quantitative Reasoning (CA3)

Course Description

This preparatory course provides tools to help students succeed in Math C180, Calculus I. Topics include systems of equations and inequalities, sequences, induction, and the Binomial Theorem; properties and graphs of linear, quadratic, polynomials, rational, exponential, logarithmic and trigonometric functions; analytic trigonometry, applications of trigonometric functions. Use a graphing utility to solve equations, and graph functions by using Desmos or GeoGebra will be introduced. PREREQUISITE: In preparation for success in MATH C180 Calculus 1, only eligible students who are STEM majors may enroll in this course; Contact a counselor for additional eligibility information. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Solve and apply equations and inequalities including linear, quadratic, absolute value, polynomial, rational, radical, exponential and logarithmic equations.
2. Apply techniques for finding zeros of polynomial functions.
3. Solve trigonometric equations.
4. Use appropriate technology as calculators or computer software to enhance mathematical thinking, visualization, and understanding.

Course Objectives

- 1. Find all real and complex roots or zeros of a polynomial equation.
- 2. Graph linear and quadratic functions.
- 3. Graph polynomial and rational functions.
- 4. Graph exponential and logarithmic functions.
- 5. Solve equations involving exponential or logarithmic expressions.
- 6. Prove or establish trigonometric identities.
- 7. Graph a quadratic function and complete the square to find its vertex.
- 8. Solve systems of linear equations.
- 9. Solve systems of inequalities.
- 10. Use the binomial theorem.
- 11. Perform algebra involving summation notation.
- 12. Apply functions to model real world applications.

Lecture Content

Graphs Rectangular Coordinates Intercepts, Symmetry, Graphing Key Equations Solving Equations Using a Graphing Utility Lines FUNCTIONS and THEIR GRAPHS Functions The Graph of a Function Properties of Functions Piecewise-defined Functions MessageBody Graphing Techniques: Transformations LINEAR and QUADRATIC FUNCTIONS Linear Functions, Their Properties Quadratic Functions and Their Properties Inequalities Involving Quadratic Functions Graphs of inequalities involving quadratic functions POLYNOMIAL and RATIONAL FUNCTIONS ody Polynomial Functions and Models Properties of Rational Functions The Graph of a Rational Function The Real Zeros of a Polynomial Functions Graphs of functions and their end behavior EXPONENTIAL and LOGARIT HMIC FUNCTIONS Composite Functions One-to-One Functions; Inverse Functions Exponential Functions Logarithmic Functions ssageBody Properties of Logarithms Logarithmic and Exponential Equations Graphs of exponential and logarithmic functions TRIGONOMETRIC FUNCTIONS Angles and Their Measure</ span> Trigonometric Functions: Unit Circle Approach Properties of the Trigonometric Functions Graphs of the Sine and Cosine Functions Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions Phase Shi ft and their graphs Phase Shift and their graphs ANALYTIC TRIGONOMETRY The Inverse Sine, Cosine, and Tangent Functions The Inverse Trigonometric Functions (Continued) Trigonometric Identities Body Sum and Difference Formulas Double-angle and Half-angle Formulas Product-to-Sum and Sum-to-Product Formulas eBody Trigonometric Equations APPLICATIONS of TRIGONOMETRIC FUNCTIONS Applications Involving Right Triangles The Law of Sines -copy-source="MessageBody The Law of Cosines Area of a Triangle SYSTEMS of EQUATIONS and INEQUALITIES Partial Fraction Decomposition System of Equations System of Inequalities SEQUENCES; INDUCTION; THE BINOMIAL THEOREM Sequences opy-source="MessageBody Mathematical Induction The Binomial Theorem

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Text, One Way (61)
- Cable (CA)

Instructional Techniques

All the instructional methods include use of computer, math software, graphing calculators, videos, and Powerpoint Presentations.

Reading Assignments

Assigned from textbook or supplementary OER source

Writing Assignments

Homework exercises, quizzes, comprehensive Midterm and Final exams

Out-of-class Assignments

Assigned written homework, problem solving exercises

Demonstration of Critical Thinking

Apply mathematics concepts to solve real world application problems, explain the reasoning, or answer written tests and a comprehensive final.

Required Writing, Problem Solving, Skills Demonstration

Included as homework assignments, part of classroom lectures and discussions, part of quizzes, Midterm Examination, Final Examination, and Projects.

Eligible Disciplines

Mathematics: Master's degree in mathematics or applied mathematics OR bachelor's degree in either of the above AND master's degree in statistics, physics, or mathematics education OR the equivalent. Master's degree required.

Textbooks Resources

1. Required Abramson, J.. Precalculus , 2nd ed. Rice University, OpenStax, 2024