

# Glendale College

## Course Outline of Record Report

Course ID 010655

Revision - May 2025

### MATH103E+ : Calculus and Analytic Geometry I with Support

#### General Information

Author:	<ul style="list-style-type: none"> <li>Suzanne Palermo</li> </ul>
Course Code (CB01) :	MATH103E+
Course Title (CB02) :	Calculus and Analytic Geometry I with Support
Department:	MATH
Proposal Start:	Spring 2026
TOP Code (CB03) :	(1701.00) Mathematics, General
CIP Code:	(27.0101) Mathematics, General.
SAM Code (CB09) :	E - Non-Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000642843
Curriculum Committee Approval Date:	05/14/2025
Board of Trustees Approval Date:	07/08/2025
Last Cyclical Review Date:	12/13/2023
Course Description and Course Note:	MATH 103E+ is the first of a sequence of three courses combining the subject matter of analytic geometry and calculus. The course covers functions and their graphs with special attention to differentiation, limits, rules and integration using various techniques. Students study the calculus of inverse functions and transcendental functions as well as applications of differentiation. Students also learn support topics such as algebra, trigonometry, limits, derivatives, and integrals.
Justification:	Content Change
Academic Career:	<ul style="list-style-type: none"> <li>Credit</li> </ul>
Mode of Delivery:	No value
Author:	No value
Course Family:	No value

#### Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none"> <li>Mathematics</li> </ul>
Alternate Discipline:	No value
Alternate Discipline:	No value

### Course Development

**Basic Skill Status (CB08)**

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

**Course Special Class Status (CB13)**

Course is not a special class.

**Pre-Collegiate Level (CB21)**

Not applicable.

**Grading Basis**

- Grade with Pass / No-Pass Option

**Course Support Course Status (CB26)**

Course is not a support course

### General Education and C-ID

**General Education Status (CB25)**

GE Status (CSU) B4, (UC) 2

**Transferability**

Transferable to both UC and CSU

**Transferability Status**

Approved

**Cal-GETC**

Area 2: Mathematical Concepts and Quantitative Reasoning

**Area**

Mathematical Concepts and Quantitative Reasoning

**Status**

Approved

**Approval Date**

09/02/2025

**Comparable Course**

No Comparable Course defined.

**GCC General Education Requirements**

Area 2: Mathematical Concepts and Quantitative Reasoning

**Area**

Mathematical Concepts and Quantitative Reasoning

**Status**

Approved

**Approval Date**

09/02/2025

**Comparable Course**

No Comparable Course defined.

### Units and Hours

**Summary**

<b>Minimum Credit Units (CB07)</b>	6
<b>Maximum Credit Units (CB06)</b>	6
<b>Total Course In-Class (Contact) Hours</b>	144
<b>Total Course Out-of-Class Hours</b>	180
<b>Total Student Learning Hours</b>	324

**Credit / Non-Credit Options**

**Course Type (CB04)**

Credit - Degree Applicable

**Noncredit Course Category (CB22)**

Credit Course.

**Noncredit Special Characteristics**

No Value

**Course Classification Code (CB11)**

Credit Course.

Variable Credit Course

**Funding Agency Category (CB23)**

Not Applicable.

Cooperative Work Experience Education Status (CB10)

**Weekly Student Hours**

	In Class	Out of Class
Lecture Hours	5	10
Laboratory Hours	3	0
Studio Hours	0	0

**Course Student Hours**

<b>Course Duration (Weeks)</b>	18
<b>Hours per unit divisor</b>	54
<b>Course In-Class (Contact) Hours</b>	
Lecture	90
Laboratory	54
Studio	0
<b>Total</b>	144
<b>Course Out-of-Class Hours</b>	
Lecture	180
Laboratory	0
Studio	0
<b>Total</b>	180

**Time Commitment Notes for Students**

No value

**Units and Hours - Weekly Specialty Hours**

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

**Prerequisites, Corequisites, Recommended Corequisites, and Recommended Preparation**

**Prerequisite**

MATH110 - Precalculus and Trigonometry (in-development)

**Objectives**

- Solve equations including rational, linear, polynomial, exponential, absolute value, radical, and logarithmic.
- Solve linear, non-linear, and absolute value inequalities.
- Graph the following types of functions and relations: polynomial, rational, exponential, logarithm, and conic section.
- Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs.

- Solve exponential and logarithmic equations.
- Apply the Fundamental Theorem of Algebra and related theorems to find the roots of a polynomial.
- Prove various trigonometric identities.
- Solve trigonometric equations.
- Apply the basic definitions of trigonometry to solve right triangle application problems.
- apply the laws of sines and cosines to solve application problems.
- Graph both polar and parametric equations.

OR

**Prerequisite**

MATH101E - Algebra and Trigonometry for Calculus

**Objectives**

- Solve equations including rational, linear, polynomial, exponential, absolute value, radical, and logarithmic.
- Solve linear, non-linear, and absolute value inequalities.
- Graph the following types of functions and relations: polynomial, rational, exponential, and logarithm.
- Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs.
- Solve exponential and logarithmic equations.
- Solve trigonometric equations.
- Apply various trigonometric identities.

OR

**Prerequisite**

Placement is based on academic background or successful completion of MATH 110 or MATH 101E.

**Entry Standards**

Entry Standards

Description

No value

No value

**Course Limitations**

Cross Listed or Equivalent Course

Description

MATH 103E - Calculus and Analytic  
Geometry I

No Value

MATH 103EH - Honors Calculus and Analytic  
Geometry I

No Value

**Requisite Validation****Upload Statistical Validation and/or other documents (if necessary)**

No Value

## Specifications

### Methods of Instruction

Methods of Instruction                      Lecture

Methods of Instruction                      Laboratory

Methods of Instruction                      Discussion

Methods of Instruction                      Multimedia

Methods of Instruction                      Tutorial

Methods of Instruction                      Collaborative Learning

Methods of Instruction                      Demonstrations

Methods of Instruction                      Guest Speakers

Methods of Instruction                      Presentations

### Out of Class Assignments

- Homework (e.g. problem sets related to course content)
- Assignments and/or projects (e.g. group projects to solve a "challenging" application problem from the textbook)

### Methods of Evaluation

Exam/Quiz/Test

Exam/Quiz/Test

### Rationale

Quizzes

Four or more chapter examinations are required

Exam/Quiz/Test A comprehensive final examination

### Textbook Rationale

No Value

### Textbooks

Author	Title	Publisher	Date	ISBN
Briggs, William	Calculus, Early Transcendentals	Cengage Learning	2019	9780134763644

### Other Instructional Materials (i.e. OER, handouts)

Description	Precalculus
Author	Abramson, Jay
Citation	<a href="https://openstax.org/details/books/prec calculus-2e">https://openstax.org/details/books/prec calculus-2e</a>
Online Resource(s)	

## Learning Outcomes

### Course Objectives

Find limits of functions at real values and at infinity using numerical, graphical, and algebraic approaches.

Determine and prove continuity and differentiability of a function at a real value.

Find the derivative of a function as a limit.

Use the derivative for rate of change problems.

Find the equation of a tangent line to a function at a point.

Compute derivatives using differentiation formulas: constants, power rule, product rule, quotient rule and chain rule. Calculate higher order derivatives.

Use differentiation to solve applications such as related rate problems and optimization problems.

Use implicit differentiation with applications, including in differentiation of inverse functions.

Find derivatives of transcendental functions: trigonometric, exponential, logarithmic, and others.

Determine relative and absolute maximum and minimum points of functions and points of inflection.

Graph functions using the methods of calculus.

Use the Mean Value Theorem.

Evaluate a definite integral as a limit of Riemann sums.

Apply integration to find areas, apply properties of integrals.

Evaluate antiderivatives and indefinite integrals.

Evaluate integrals using the Fundamental Theorem of Calculus.

Use substitution to integrate.

Apply l'Hospital's rule to find limits of indeterminate forms.

#### SLOs

**Find limits, derivatives, and integrals of algebraic, trigonometric, transcendental, and inverse functions.**

Expected Outcome Performance: 70.0

**Use limits, derivatives, and integrals to graph functions and solve application problems.**

Expected Outcome Performance: 70.0

## Additional SLO Information

**Does this proposal include revisions that might improve student attainment of course learning outcomes?**

No

**Is this proposal submitted in response to learning outcomes assessment data?**

No

**If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.**

No Value

**SLO Evidence**

No Value

## Course Content

### Lecture Content

#### Review and Preview (12 hours)

- Four Ways to Represent a Function
- Mathematical Models
- New Functions from Old Functions
- Exponential Functions
- Inverse Functions and Logarithms
- Motivation for college success in mathematics
- Math test taking techniques

#### Limits and Rates of Change (18 hours)

- The Tangent and Velocity Problems
- The Limit of a Function
- Calculating Limits using the Limit Laws
- The Precise Definition of a Limit
- Continuity
- Limits at Infinity; Horizontal Asymptotes
- Derivatives and Rates of Change
- The Derivative as a Function
- Study Skills: Critical Thinking Skills

#### Differentiation Rules (22 hours)

- Derivatives of Polynomials and Exponential Functions
- Differentiation Formulas
- Derivatives of Trigonometric Functions
- The Chain Rule
- Implicit Differentiation
- Derivatives of Logarithmic Functions
- Rates of Change in the Natural and Social Sciences
- Exponential Growth and Decay
- Related Rates
- Linear Approximations and Differentials
- Hyperbolic Functions
- STEM exploration and community resources

#### Applications of Differentiation (22 hours)

- Maximum and Minimum Values
- The Mean Value Theorem
- How Derivatives Affect the Shape of a Graph

- Indeterminate Forms and l'Hospital's rule
- Graphing functions using first and second derivatives, concavity and asymptotes
- Graphing with technology (Optional)
- Optimization Problems
- Newton's Method
- Antiderivatives
- College math support resources

**Integrals (16 hours)**

- Areas and Distances
- The Definite Integral
- The Fundamental Theorem of Calculus
- Indefinite Integrals and the Net Change Theorem
- The Substitution Rule

**Total hours: 90****Laboratory/Studio Content****Mathematical Review Content (33 hours)**

- Algebra Review
- Trigonometric Review
- Graphing Review

**Calculus Content (21 hours)**

- Limits
- Derivatives
- Integrals
- Calculus applications

**Total hours: 54****Additional Information****Repeatability**

Not Repeatable

**Justification (if repeatable was chosen above)**

No Value

**Is it possible this course will have a material fee?**

No

**I have contacted my library liaison (<https://campusguides.glendale.edu/faculty/liasons>):**

No

**What term(s) will this course be offered?**

Fall/Winter/Spring/Summer

Will any additional resources be needed for this course? (Click all that apply)

- No

If additional resources are needed, add a brief description and cost in the box provided.

No Value