

Glendale College

Course Outline of Record Report

Course ID 010336

Revision - June 2025

MATH103E : Calculus & Analytic Geometry I

General Information

Author:	<ul style="list-style-type: none"> Suzanne Palermo
Attachments:	DE_Addendum_MATH_103E_COR_9:8:21_Code_9:28:21.pdf DE Addendum_MATH_103E & 103EH COR_5:8:2024 CoDE_5:28:2024.pdf
Course Code (CB01) :	MATH103E
Course Title (CB02) :	Calculus & Analytic Geometry I
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) :	CCC000598024
Curriculum Committee Approval Date:	05/14/2025
Board of Trustees Approval Date:	07/08/2025
Last Cyclical Review Date:	05/08/2024
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. Functions and their graphs are studied with special attention to differentiation, limits, rules and integration using various techniques. The calculus of inverse functions and transcendental functions as well as applications of differentiation is also covered.
Justification:	Content Change
Academic Career:	<ul style="list-style-type: none"> Credit
Mode of Delivery:	No value
Author:	No value
Course Family:	No value

Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none"> Mathematics
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.

C-ID

MATH

Area

Mathematics

Status

Approved

Approval Date

08/30/2021

Comparable Course

MATH 210 - Single Variable Calculus I Early Transcendentals

Units and Hours

Summary

Minimum Credit Units (CB07)

5

Maximum Credit Units (CB06)

5

Total Course In-Class (Contact) Hours

90

Total Course Out-of-Class Hours

180

Total Student Learning Hours 270

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.

Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience Education Status (CB10)

Variable Credit Course

Weekly Student Hours

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

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	90
Laboratory	0
Studio	0
Total	90
Course Out-of-Class Hours	
Lecture	180
Laboratory	0
Studio	0
Total	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 103EH - Honors Calculus & Analytics 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 Discussion

Methods of Instruction Multimedia

Methods of Instruction Collaborative Learning

Methods of Instruction Demonstrations

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

Exam/Quiz/Test

Rationale

Four or more chapter examinations are required

Quizzes

A comprehensive final examination

Textbook Rationale

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
Briggs, Cochran, Gillet and Schultz	Calculus Early Transcendentals	Pearson	2019	9780134763644

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

No Value

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

GEOL
Geology AS-T Degree

Apply reasoning to evaluate hypotheses and theories; analyze, interpret, and present research evidence

Develop foundational knowledge to be able to use evidence-based approaches to explore and evaluate global issues such as natural disaster preparation, energy, resources, and climate

BIOL
Biological Sciences A.S.
Degree

Critically examine biological data and present their findings.

BIOL
Biology AS-T

Describe and demonstrate correct use of biology laboratory equipment, and be well-qualified as transfer students to a four-year university biology program.

MATH
Mathematics A.S. Degree

Evaluate limits, derivatives and integrals

MATH
Mathematics - A.A. Degree
Major

Evaluate limits, derivatives and integrals.

ILOs
Core ILOs

Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims.

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

Expected Outcome Performance: 70.0

ILOs
Core ILOs

Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.

Use quantitative and/or analytical mathematical skills to solve problems and to interpret, evaluate, and process information and data to draw logical conclusions and support claims.

GEOL
Geology AS-T Degree

Apply reasoning to evaluate hypotheses and theories; analyze, interpret, and present research evidence

Develop foundational knowledge to be able to use evidence-based approaches to explore and evaluate global issues such as natural disaster preparation, energy, resources, and climate

BIOL
Biological Sciences A.S.
Degree

Critically examine biological data and present their findings.

<i>BIOL</i> Biology AS-T	Describe and demonstrate correct use of biology laboratory equipment, and be well-qualified as transfer students to a four-year university biology program.
<i>MATH</i> Mathematics - A.A. Degree Major	Evaluate limits, derivatives and integrals. solve applications in math and science using derivatives, integrals, differential equations and linear algebra.
<i>MATH</i> Mathematics A.S. Degree	Solve applications in math and science using derivatives, integrals, differential equations and linear algebra

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

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

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

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

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

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/liaisons>):

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