

# Glendale College

## Course Outline of Record Report

Course ID 010428  
Cyclical Review - March 2025

### MATH112+ : Calculus for Business with Support

#### General Information

Author:	<ul style="list-style-type: none"> <li>Suzanne Palermo</li> </ul>
Attachments:	DE Addendum_MATH_112+_COR_3:26:25_CoDE_5:27:25.pdf
Course Code (CB01) :	MATH112+
Course Title (CB02) :	Calculus for Business 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:	Yes
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000607060
Curriculum Committee Approval Date:	03/26/2025
Board of Trustees Approval Date:	06/17/2025
Last Cyclical Review Date:	03/26/2025
Course Description and Course Note:	MATH 112+ is a one-semester course in calculus for business, management, and social science majors. This course has a built-in support lab component. Students cover topics that include techniques of differentiating, maximum-minimum problems, curve sketching, derivatives and applications of exponential and logarithmic functions, and techniques of integration.
Justification:	Mandatory Revision
Academic Career:	<ul style="list-style-type: none"> <li>Credit</li> </ul>
Mode of Delivery:	<ul style="list-style-type: none"> <li>In-Person</li> <li>Remote</li> <li>Hybrid</li> <li>Proctored Online</li> </ul>
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>	5.5
<b>Maximum Credit Units (CB06)</b>	5.5
<b>Total Course In-Class (Contact) Hours</b>	135
<b>Total Course Out-of-Class Hours</b>	180
<b>Total Student Learning Hours</b>	315

**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	2.5	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 45

Studio 0

**Total** 135

**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**

Placement is based on academic background or satisfactory completion of Intermediate Algebra or the equivalent.

**Entry Standards**

Entry Standards	Description
No value	No value

**Course Limitations**

Cross Listed or Equivalent Course	Description
MATH 112 Calculus for Business	No Value

**Specifications****Methods of Instruction**

Methods of Instruction	Lecture
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Methods of Instruction	Discussion
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Methods of Instruction	Multimedia
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Methods of Instruction	Demonstrations
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**Out of Class Assignments**

- Homework (e.g. problem sets related to course content)
- Group assignments and projects (e.g. analyze a business' profit and loss, analyze supply and demand for a product)
- Computer or graphing calculator assignments

**Methods of Evaluation****Description of Activity/Interaction**

Exam/Quiz/Test	Quizzes
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Exam/Quiz/Test	5-7 chapter examinations are required
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Exam/Quiz/Test	A comprehensive final examination is required
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**Textbook Rationale**

No Value

**Textbooks**

Author	Title	Publisher	Date	ISBN
Stefan Waner, Steven Costenoble	Applied Calculus	Cengage	2023	978-0357723487

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

<b>Description</b>	Mathematics Division generated materials
<b>Author</b>	No value
<b>Citation</b>	No value
<b>Online Resource(s)</b>	

**Learning Outcomes****Course Objectives**

Demonstrate understanding of exponents, linear equations and inequalities, and functions.

Differentiate various types of functions by using the product, quotient and chain rules.

Find the derivatives of polynomial, rational, exponential and logarithmic functions.

Use derivatives to find rates of change and tangent lines.

Sketch the graph of functions using horizontal and vertical asymptotes, intercepts, and first and second derivatives to determine intervals where the function is decreasing and increasing, maximum and minimum values, intervals of concavity and points of inflection.

Apply the rules of differentiation to solve optimization problems.

Use calculus to analyze revenue, cost and profit.

Apply the calculus of exponential and logarithmic functions to application problems.

Apply the various techniques of integration to definite, indefinite, and improper integrals by using the general integral formulas, integration by substitution, and other integration techniques.

Analyze the marginal cost, profit and revenue when given the appropriate function.

Use integration in business and economics applications.

## SLOs

**Find, apply, and interpret graphic, symbolic, numerical/data, and verbal/applied representations of the derivative.** 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.

*ST DV*  
Liberal Arts: Science and Mathematics  
Emphasis A.A. Degree Apply mathematical and scientific ideas to analyze real-world situations.

*MATH*  
Mathematics - A.A. Degree Major Evaluate limits, derivatives and integrals.

solve applications in math and science using derivatives, integrals, differential equations and linear algebra.

*ILOs*  
General Education apply techniques of analysis and critical thinking to critique real world and theoretical topics and issues

**Find, apply, and interpret graphic, symbolic, numerical/data, and verbal/applied representations of integration.** 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.

*ST DV*  
Liberal Arts: Science and Mathematics  
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Mathematics - A.A. Degree Major Evaluate limits, derivatives and integrals.

solve applications in math and science using derivatives, integrals, differential equations and linear algebra.

*ILOs*  
General Education apply techniques of analysis and critical thinking to critique real world and theoretical topics and issues

**Apply calculus to business related 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.

<i>ST DV</i> Liberal Arts: Science and Mathematics Emphasis A.A. Degree	Apply mathematical and scientific ideas to analyze real-world situations.
<i>ECON</i> Economics AA-T Degree	Develop a broad and critical understanding of the complex interconnections between the human and environmental forces in their world.
<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>ILOs</i> General Education	apply techniques of analysis and critical thinking to critique real world and theoretical topics and issues

## 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

#### Preliminaries (8 hours)

- Algebra review
- The Cartesian Coordinate System
- Lines

#### Functions, Limits, and the Derivative (15 hours)

- Functions and their graphs, including exponential and logarithmic functions
- The algebra of functions
- Functions and mathematical models
- Limits and intuitive limit definition of derivative
- One-sided limits and continuity
- Increments, tangent lines and rate of change

#### Differentiation (15 hours)

- Rules of differentiation, including sum, difference, product and quotient rules
- The chain rule
- Marginal functions in economics
- Higher-order derivatives
- Implicit differentiation and related rates
- Differentials

#### Applications of the Derivative (16 hours)

- Applications of the first derivative – increasing/decreasing and extrema
- Applications of the second derivative – concavity and points of inflection
- Curve sketching
- Optimization - extreme value theorem
- Optimization – applications

#### **Exponential and Logarithmic Functions (14 hours)**

- Exponential functions
- Logarithmic functions
- Compound interest
- Differentiation of exponential functions
- Differentiation of logarithmic functions
- Exponential functions as mathematical models

#### **Integration (15 hours)**

- Antiderivatives, indefinite integrals and the rules of integration
- Integration by substitution
- Approximating definite integral as a sum
- Area and the definite integral
- The Fundamental Theorem of Calculus
- Evaluating definite integrals
- Area between two curves
- Applications of the definite integral to business and economics

#### **Additional Topics in Integration (7 hours)**

- Integration by parts
- Numerical integration (optional)
- Improper integrals

**Total Hours: 90**

### **Laboratory/Studio Content**

#### **Laboratory Content (45 hours)**

- Geometry Review
  - Perimeter
  - Area
- Calculator use
- Exponents
  - Properties
  - Rational exponents
- Multiplication of polynomials
- Factoring polynomials
- Rational expressions
  - Zero in numerator and/or denominator
  - Working with averages
  - Difference quotients
- Equations
  - Rational equations
  - Exponential equations
- Inequalities
  - Linear
  - Non-linear
- Radicals
- Functions
  - Function notation
  - Domain and range
  - Graphing
  - Linear functions
  - Polynomial and rational functions
  - Exponential and log functions
- Systems of linear equations
- Problem solving strategies

**Total Hours: 45**

**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 Value

**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

**Resources****Did you contact your departmental library liaison?**

No

**If yes, who is your departmental library liaison?**

No Value

**Did you contact the DEIA liaison?**

No

**Were there any DEIA changes made to this outline?**

No

**If yes, in what areas were these changes made:**

No Value

**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