

MATH-C2210: CALCULUS I: EARLY TRANSCENDENTALS

Effective Term

Fall 2026

CC Approval

11/07/2025

AS Approval

11/13/2025

BOT Approval

11/20/2025

COCI Approval

12/10/2025

SECTION A - Course Data Elements

CB04 Credit Status

Credit - Degree Applicable

Discipline

Minimum Qualifications	And/Or
Mathematics (Master's Degree)	

Subject Code

MATH - Mathematics

Course Number

C2210

Department

Mathematics

Division

Mathematics (MATH)

Full Course Title

Calculus I: Early Transcendentals

Short Title

Calculus I: Early Transcendent

CB03 TOP Code

1701.00 - Mathematics, General

CB08 Basic Skills Status

NBS - Not Basic Skills

CB09 SAM Code

E - Non-Occupational

Rationale

Updating to align with Common Course Numbering template as required.

SECTION B - Course Description

Catalog Course Description

A first course in differential and integral calculus of a single variable. Topics include limits and continuity of functions, techniques and applications of differentiation, an introduction to integration, and the Fundamental Theorem of Calculus. This course is primarily intended for Science, Technology, Engineering, and Mathematics (STEM) majors.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit

No

Repeatability

Not Repeatable

Grading Options

Letter Grade Only

Allow Audit

Yes

Requisites

Prerequisite(s)

Pre-calculus, or college algebra and trigonometry, or equivalent, or placement as determined by the college's multiple measures assessment process.

Advisory Prerequisite(s)

Completion of Math-110 with a minimum grade of C or appropriate placement.

Advisory Corequisite(s)

Students who do not place directly into this course may enroll if they also enroll in the corresponding corequisite course.

Requisite Justification

Requisite Description

Non-course Requisite

Level of Scrutiny

Requisite Established by Statute/Regulation

Explanation

Requisite required by Chancellor's Office for Common Course Numbering Templates.

SECTION D - Course Standards

Is this course variable unit?

No

Units

5.00

Lecture Hours

90.00

Outside of Class Hours

180

Total Contact Hours

90

Total Student Hours

270

Distance Education Approval

Is this course offered through Distance Education?

Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

SECTION E - Course Content**Student Learning Outcomes**

Upon satisfactory completion of the course, students will be able to:	
1.	Compute derivatives of elementary functions and their algebraic combinations.
2.	Solve applications involving derivatives.
3.	Evaluate integrals using the Fundamental Theorem of Calculus.
4.	Write mathematical proofs.

Course Objectives

Upon satisfactory completion of the course, students will be able to:	
1.	Compute the limit of a function and evaluate indeterminate forms using L'Hôpital's Rule.
2.	Determine the continuity of a function.
3.	Find the derivative of a function as a limit.
4.	Find the equation of a tangent line to the graph of a function.
5.	Compute derivatives using differentiation formulas.
6.	Use differentiation to solve applications such as related rate problems and optimization problems.
7.	Use implicit differentiation and find derivatives of transcendental functions.
8.	Graph functions using methods of calculus.
9.	Evaluate a definite integral as a limit.
10.	Evaluate integrals using the Fundamental Theorem of Calculus.
11.	Apply integration to find areas.

Course Content

- Limits: intuitive and precise definitions; computation using numerical, graphical, and algebraic approaches
- Continuity and differentiability of functions
- Derivative as a limit
- Interpretation of derivatives as slopes of tangent lines and rates of change
- Differentiation formulas: constants, power rule, product rule, quotient rule, and chain rule
- Derivatives of transcendental functions including trigonometric, exponential, and logarithmic
- Implicit differentiation, differentiation of inverse functions, including inverse trigonometric functions
- Applications of differentiation, including related rates and optimization
- Higher-order derivatives
- Indeterminate forms and L'Hôpital's Rule
- Maximum and minimum values, Extreme Value Theorem
- Graphing functions using first and second derivatives, concavity, and asymptotes
- Mean Value Theorem
- Antiderivatives and indefinite integrals
- Definite integrals as limits of Riemann sums
- Interpretation of the integral as area under a curve and net change
- Basic integration rules and properties of integrals
- Fundamental Theorem of Calculus
- Integration by substitution

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Lecture	Lecture on real-world applications on exponential and logarithmic functions including applications to radioactive decay, population growth in biology, and drug concentration in medicine.
Discussion	Students will engage in a guided discussion where they explain the derivative using the limit definition in their own words and compare how the slope behaves for different functions selected by their classmates.
Activity	Students will work in small groups to analyze the graphs of several functions and identify intervals where the derivative is positive, negative, or zero, then justify their conclusions using limit-based reasoning.

Online Adaptation

Types	Examples of learning activities
Lecture	Lecture on Zoom about real-world applications on exponential and logarithmic functions including applications to radioactive decay, population growth in biology, and drug concentration in medicine.
Discussion	Students will participate in an online discussion board where they explain the derivative using the limit definition in their own words and respond to classmates by comparing how the slope behaves for different functions.

Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards
 Chat Rooms
 Discussion Boards
 E-mail Communication
 Telephone Conversations
 Video or Teleconferencing

Student-Initiated Online Contact Types

Chat Rooms
 Discussions
 Group Work

Course design is accessible

Yes

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Other	Students should demonstrate their mastery of the learning objectives and their ability to devise, organize, and present complete solutions to problems. Examples of potential methods of evaluation include, but are not limited to, exams, quizzes, homework, classwork, technology-based activities, laboratory work, projects, and research demonstrations. Methods of evaluation are at the discretion of local faculty.
Exams/Tests	Students will complete a comprehensive final exam covering all major topics from the semester, demonstrating their ability to apply concepts including limits, derivatives, applications of derivatives, and introductory integration.

Other

The Mathematics Department maintains a commitment to diverse teaching methods in courses emphasizing vital quantitative skills and qualitative reasoning ability (PEP Program Mission Statement, 2011). To that end, it is expected that sufficient formative assessments will be given to students that in frequency, length and rigor adequately assess both quantitative skills and qualitative reasoning.

Examples:

- 1) An exam including differentiation where the student would be expected to calculate derivatives using a variety of techniques (power rule, product rule, quotient rule, and the chain rule).
- 2) An exam including integration where the student would be expected to find antiderivatives for a variety of functions using manipulation and u-substitutions and calculate definite integrals using area of rectangles and the Fundamental Theorem of Calculus.

Assignments

Reading Assignments

Read sections from the text, for example:

1. Read the section on the chain rule for derivatives.
2. Read the section on the Mean Value Theorem.

Writing Assignments

Daily homework will be completed from the text, for example:

1. An open-top box with a square base is made from 200 square feet of cardboard. Find the dimensions that maximize volume.
2. Find the area under $f(x) = x$ between $x = 0$ and $x = 1$ as the limit of a sum.

Outside-of-Class Assignments

Other assignments such as research into applications or group projects assigned at instructors' discretion.

SECTION F - Textbooks and Instructional Materials

Material Type

Textbook

Author

Stewart, James

Title

Calculus, Early Transcendentals

Edition/Version

9th

Publisher

Cengage

Year

2021

Rationale

CCN template recommendation.

ISBN

9780357633298

Material Type

Open Educational Resource (OER)

Author

Strang, G., Herman, E. et al.

Title

Calculus Volume 1

Publisher

OpenStax

Year

2025

ISBN #

<https://openstax.org/details/books/calculus-volume-1/>

Material Type

Textbook

Author

Briggs, W., et al

Title

Calculus: Early Transcendentals

Edition/Version

3rd

Publisher

Pearson

Year

2019

Rationale

CCN template recommendation.

ISBN #

9780136880677

Material Type

Textbook

Author

Hass, J. et al.

Title

Thomas' Calculus: Early Transcendentals

Edition/Version

15th

Publisher

Pearson

Year

2023

Rationale

CCN template recommendation.

ISBN #

9780137559824

SECTION G - Diversity, Equity and Inclusivity

How does your course and/or course outline of record reflect strategies for accommodating and engaging diverse student populations, advancing equitable outcomes, and fostering inclusion for all students?

This course supports diverse student populations through the use of multiple representations of concepts, varied applications, and technology. Strategies may also include collaborative learning, transparent assessment practices, low-cost resources, and opportunities for students to connect course material to their own experiences, fostering equitable outcomes and an inclusive classroom environment.

Course Codes (Admin Only)

CB00 State ID

CCC000561098

CB10 Cooperative Work Experience Status

N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status

Y - Credit Course

CB13 Special Class Status

N - The Course is Not an Approved Special Class

CB23 Funding Agency Category

Y - Not Applicable (Funding Not Used)

CB24 Program Course Status

Program Applicable

Allow Pass/No Pass

No

Only Pass/No Pass

No