1. Instructor

- Instructor: Michael McCabe
- Email: mccabem85@cod.edu
- Phone: 630 942 2152 (I can hear voicemails away from my desk.)
- Office: BIC 3436 B (Blackboard Collaborate if campus is closed)
- Office Hours: TBD

2. Course Description

- Students are required to attend lecture Monday, Wednesay, and Friday from 12:00 pm to 1:25 pm.
  - Lecture will take place in Blackboard Collaborate. This will be accessed by clicking on "Link to Lecture" and then clicking on "Lecture" (the link will appear 15 minutes prior to the start time).
  - For days that Blackboard Collaborate is down, live sessions will be hosted at twitch.tv/codmccabe.
- A recorded lecture of some form will be available upon request.
- Students are expected to attend the whole session and will be tracked by Blackboard Collaboration attendance interface.
- Students are expected to have Learning Catalytics up and running prior to class to earn participation points.
- Instructor will be grateful if students use quick reaction tools provided by Blackboard Collaborate.
- Instructor will be joyful if students ask questions during lecture.

- Course Title: Calculus and Analytic Geometry I
- Course Number: 2231
- Credit Hours: 5, Clinical Hours: 0, Lecture Hours: 5, Lab Hours: 0
- Course description to appear in catalog: This is the first calculus course for students majoring in science, technology, engineering, and mathematics. Topics include lines, circles, functions, limits, continuity, the derivative, rules for differentiation of algebraic, trigonometric, and the transcendental functions, related rates, mean value theorem, optimization and curve sketching, differentials, Newton's method, antiderivatives and integration, and the fundamental theorem of calculus.
- Repeatable for credit: No
- Pre-Enrollment Criteria:
- Prerequisite: MATH 1431 Precalculus I with a grade of "C" or better, or equivalent and
- Prerequisite: MATH 1432 Precalculus II: Trigonometry with a grade of "C" or better, or equivalent or
- Prerequisite: a qualifying score on the mathematics placement test

3. Course Objectives

Upon successful completion of the course the student should be able to do the following:

(1) Use the definition of the limit of a function
(2) Evaluate limits graphically, numerically, and algebraically
(3) Evaluate one-sided limits
(4) Determine the continuity of a function at a point and over an interval
(5) Find the derivative of a function using the limit definition

  (6) Determine the differentiability of a function at a point and over an interval

  (7) Use the intermediate value theorem

  (8) Use the rules of differentiation to find the derivative of a function (including the product, quotient, and chain rules)

  (9) Differentiate implicitly

(10) Use derivatives in geometry and other applications that involve rates of change

(11) Determine higher order derivatives, with applications to linear motion

(12) Determine the differential of a function and use it in error analysis

(13) Find the location and type of all relative and absolute extrema of a function by using its first and second derivatives

(14) Use derivatives to determine where a function is increasing, where it is decreasing, where its graph is concave upward, and where its graph is concave downward

(15) Use the extreme value theorem

(16) Use Rolle's theorem and the mean value theorem

(17) Determine the limit of a function at infinity

(18) Use L'Hopital's rule to evaluate limits for indeterminate forms

(19) Evaluate limits having indeterminate forms

(20) Compare and contrast relative rates of growth

(21) Locate all (if any) vertical, horizontal, and slant asymptotes on the graph of a function

(22) Construct the graph of a function by locating all intercepts, asymptotes, and relative extrema points, and by determining concavity over the domain of the function

(23) Solve optimization problems including applications

(24) Determine the approximate zeros of a function using Newton's Method

(25) Solve related rate problems including applications

(26) Determine the antiderivative of a function

(27) Solve a separable differential equation and an initial value problem

(28) Estimate a definite integral using a Riemann sum

(29) Evaluate a definite integral by taking the limit of a Riemann sum

(30) Use the fundamental theorem of calculus to evaluate a definite integral

(31) Use substitution to determine definite and indefinite integrals

(32) Use the properties of definite and indefinite integrals

(33) Determine the mean value of a continuous function over a closed interval

(34) Define the exponential and logarithmic functions

(35) Graph the exponential and logarithmic functions

(36) Simplify expressions using properties of logarithms

(37) Differentiate logarithmic and exponential functions, including bases other than e

(38) Integrate logarithmic and exponential functions, including bases other than e

(39) Apply logarithmic differentiation

(40) Evaluate integrals that result in logarithmic functions

(41) Evaluate expressions involving inverse trigonometric functions

(42) Differentiate expressions involving inverse trigonometric functions and trigonometric functions

4. Topical Outline

Topical Outline:

  (1) Review

    (a) Straight lines and circles

    (b) Functions and their graphs

         (i) Symmetry

         (ii) Domain and range

         (iii) Interval notation

         (iv) Special functions

         (v) Absolute value

         (vi) Polynomial

         (vii) Rational

         (viii) The greatest-integer function

         (ix) Logarithmic and exponential functions

    (c) Trigonometry

         (i) Special angles and radian measure

         (ii) Trigonometric identities

         (iii) Inverse trigonometric functions

(2) Limits and continuity

    (a) Limits

         (i) Numerical and graphical approach to limits

         (ii) Definition and proof using epsilon and delta

         (iii) Limit theorems and techniques for evaluation of limits

         (iv) One-sided limits Infinite limits

         (v) Trigonometric limits

    (b) Continuity

         (i) Definition

         (ii) Properties

    (c) The intermediate value theorem

(3) The derivative

    (a) Definition

         (i) Derivative as a slope of tangent line

         (ii) Derivative as instantaneous rate of change

         (iii) Velocity and acceleration in linear motion

    (b) Formulas for finding derivatives

         (i) Sum, difference, product, and quotient rules

         (ii) Power rule and chain rule

         (iii) Sine, cosine, tangent, cosecant, secant, and cotangent

         (iv) Logarithmic and exponential functions

    (c) Implicit differentiation

    (d) Logarithmic differentiation

    (e) Higher order derivatives

    (f) Derivatives and continuity

(4) Application of the derivative

    (a) Related rates

    (b) Maxima and minima

         (i) Extreme value theorem

         (ii) Rolle's theorem

         (iii) Mean value theorem

         (iv) Test for increasing and decreasing functions

    (v) First derivative test and second derivative test

    (vi) Concavity and points of inflection

    (vii) Applications

  (c) Limits at infinity

  (d) L'Hopital's Rule

  (e) Asymptotes

  (f) Newton's method

  (g) Business applications (optional)

  (h) Differentials

(5) Definite and indefinite integrals

  (a) Antiderivatives and the indefinite integral

  (b) Integration by substitution

  (c) Sigma notation and Riemann sums

  (d) The definite integral and area

  (e) The fundamental theorem of calculus

  (f) The properties of the definite integral

  (g) Definite integrals with substitution

  (h) Mean value theorem for integrals

(6) Transcendental functions

  (a) Logarithmic and exponential functions

    (i) Integration Bases e, 10, and other

    (ii) Inverse trigonometric functions and their derivatives

5. Required Text

- Thomas' Calculus: Early Transcendentals, 14th edition; by Joel R. Hass Christopher E Heil Maurice D. Weir
- Acceptable ISBN Numbers: 9780135961278, 9780134439341, 9780136207948, 9780136207931, 9780134768496, or 9780134764528.
- Assignments in My Math Lab make up at least 20% of the overall grade.
- Please contact instructor for any questions or concerns prior to purchasing material.
- Web-camera and internet access is required.

6. Method of Evaluation

(1) Final Exam (weight 20%)

  (a) Cumulative final.

  (b) Intended to be 2 times as long as "regular" exams throughout the semester.

  (c) Proctoring:

    (i) A decision has not been made on how the final will be proctored.

(2) Exams (weight 20%)

  (a) About every 3 or 4 weeks there will be an exam on the recent material.

  (b) Exams are student's opportunity to present full understanding of the recent material. Treat exams as a presentation with thought-out solutions to educate the reader.

  (c) At least one exam will be proctored:

    (i) Will require the use of a webcam[1].

    (ii) Will require internet connection.

    (iii) More details will follow.

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[1]A video camera that inputs to a computer connected to the internet, so that its images can be viewed by internet users.

(3) My Math Lab Homework (weight 20%)

    (a) Several sections in the textbook will be covered throughout the semester. Shortly after a section is covered there will be a My Math Lab homework set that will be due at midnight.

    (b) Of all the My Math Lab homework assignments, at least three of the lowest scores will be dropped. "There will be at least 3 drops."

    (c) Since there will be dropped homework assignments there will be no make-up assignments.

    (d) **There will be no make-up or extensions to My Math Lab homework assignments.**

    (e) Do not contact me for accommodations due to medical issues. All accommodations due to medical issues must be directed to the Access and Accommodations department at the College of DuPage. Please do not send me any doctors notes or medical records.

(4) Turn-Ins (weight 20%)

    (a) Shortly after a section is covered a Turn-In assignment will be due.

    (b) This is an opportunity to put "pencil-to-paper" the material taught in class. It is also a great source for asking questions if confusion exists.

    (c) "There will be at least 3 drops."

    (d) Late assignments will be accepted with at least a 10% point deduction.

    (e) Do not contact me for accommodations due to medical issues. All accommodations due to medical issues must be directed to the Access and Accommodations department at the College of DuPage. Please do not send me any doctors notes or medical records.

(5) Attendance and Participation (weight 10% each)

    (a) Attendance will be tracked by Blackboard Collaborate.

        (i) Do not access the class as guest or you will not receive attendance points for that day.

        (ii) Use Chrome Browser to ensure seamless connection with Blackboard Collaborate.

        (iii) Access Illinois and County government websites for locations of free WiFi locations if necessary.

        (iv) There will be at least 3 attendance session with the lowest score which will be dropped from the attendance-portion score. "There will be at least 3 drops."

        (v) **<u>There will be no extensions for attendance for any reason.</u>**

    (b) Participation will be tracked by Learning Catalytics.

        (i) Learning Catalytics can be access through MML Assignments (usually at the bottom of the page).

        (ii) Must submit answers to each question to receive participation points.

        (iii) There will be at least 3 participation session with the lowest score which will be dropped from the Participation-portion score. "There will be at least 3 drops."

        (iv) **<u>There will be no extensions for participation for any reason.</u>**

6.1. **Calculate Grade.** Almost all methods of evaluation is open for discussion.

Category	Earned Total	Available Total	Percent	Weight	Percent × Weight
Final	156	200	78.0	20	$78 \times 20 = 1560$
Exams	250	400	62.5	20	$62.5 \times 20 = 1250$
MML	200	230	87	20	$87 \times 20 = 1740$
Turn-Ins	32	35	91.4	20	$91.4 \times 20 = 1828$
Attendance	39	42	92.9	10	$92.9 \times 10 = 929$
Participation	38	42	90.5	10	$90.5 \times 10 = 905$
			Totals	100	8212
				Grade	$\frac{8212}{100.0} = 82.12$

TABLE 1. Earned Totals are completely made up and the Available Total is **about** the actual value at the end of the semester.

Category	Earned Total	Available Total	Percent	Weight	Percent × Weight
Final				20	
Exams				20	
MML				20	
Turn-Ins				20	
Attendance				10	
Participation				10	
			Totals	100	
				Grade	

TABLE 2. Blank Table (Ask for available totals after spring break)

7. ACADEMIC CALENDAR

- Monday, January 25 Class begins.
- Monday, March 29 to Sunday, April 4 Spring Break (NO CLASS).
- Sunday, April 18 Last day to Withdraw.
- Saturday, May 15 to Friday, May 21 Final Evaluations/Culminating Activities.

8. TENTATIVE SCHEDULE

For due dates look to Blackboard calendar. Here is the tentative content schedule:

	Monday	Wednesday	Friday	Notes
1	Tech Day	a1 and a3	11 and 12	
2	21 and 22	22, 23, and 24	24 and 25	
3	31	32	Review	Exam Week
4	33 and 34	34 and 35	35 and 36	
5	38	39	Review	Exam Week
6	37 and 310	310 and 311	311 and 41	
7	42	43	26	
8	44	44 and 45	45	
9	46	47	Review	Exam Week
10	Spring	Break	No	School
11	48	51	52	
12	53	53 and 54	54	
13	55	55 and 56	56	
14	71	72	Review	Exam Week
15	73	73 and 81	81	
16	Review	Week	Yay!	
Finals	Finals	Week	Yay!	

TABLE 3. Tentative Schedule

9. SUGGESTIONS AND ADVICE

(1) In class
   (a) Use Chrome browser to video Blackboard Collaborate
   (b) Tabs to open
      (i) Blackboard Math 2231 Course
      (ii) Blackboard Collaborate
      (iii) Class Notebook in OneNote
      (iv) My Math Lab

      (c) Ask questions and use the quick response options provided by Blackboard Collaborate.

(2) Outside of class

      (a) Prior to class read the sections about to be covered.

      (b) With at least a one hour break attempt the Turn-In assignment for the section covered in class.

      (c) With at least a one hour break attempt the My Math Lab homework for the section covered in class.

      (d) Attend office hours for at least 30 minutes each week.

(3) Weekends

      (a) Finish all assignments not completed throughout the week.

      (b) Study the 3 questions created.

(4) Communication

      (a) Email mccabem85@cod.edu for personal or academic matters.

      (b) Use Discord for for general questions about assignments, due dates, or other class related questions.

      (c) Use Discord DM for quick non-personal/non-academic matters that it not class related.

Category	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total hours
Personal Time	5pm to 6pm	5pm to 6pm	5pm to 6pm	5pm to 6pm	5pm to 6pm	5pm to 6pm	5pm to 6pm	7
Work on Turn-Ins	6pm to 7pm		6pm to 7pm		6pm to 7pm		6pm to 7pm	4
Work on My Math Lab	7pm to 8pm	7pm to 8pm	7pm to 8pm	7pm to 8pm	7pm to 8pm	7pm to 8pm	7pm to 8pm	7
Math Assistance Area	8pm to 9pm	8pm to 9pm	8pm to 9pm	8pm to 9pm				4

FIGURE 1. These are made up time frames.

10. ACADEMIC HONESTY

As members of the College of DuPage community, we share a commitment to the highest standards of learning and ethical behavior. The College and its faculty strive to build meaningful and productive relationships with our students. The expectation of honesty and effort is the foundation of that relationship. Academic dishonesty damages the learning partnership built between student and faculty and is considered a serious breach of the principles of learning and growth. Violations of the Code of Academic Conduct will be dealt with appropriately and may become part of a student's educational record. Please don't risk it! For further information about the expectations, please review the Code of Academic Conduct found at the following website:Code of Academic Conduct.

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11. WITHDRAWAL POLICY

Withdrawal from a Class. The final day for a student to withdraw from any course will be equal to 75% of the time for the respective academic session (see the Registration Calendar) through MyAccess or in person at the Registration office, Student Services Center (SSC), Room 2221.

Administrative Withdrawal. After the deadline, students will be required to appeal for late withdrawal and provide appropriate documentation to the Student Registration Services Office for all requests. Students who are granted approval to withdraw by petition will not be eligible for refunds of tuition or fees and will receive a 'W' grade on their transcript. Appeals must be submitted prior to the designated final exam period for 16-week classes and before the last class meeting for all other session classes.

Coronavirus Information. Stay up to date with information provided by the college about alternative withdrawal policies. Coronavirus Information

12. Access and Accommodations

- As a course policy, I do not accept late work/make up for MML assignments, attendance, and participation. I am committed to providing fair, equal, and unbiased accommodations. If you believe that your circumstances qualify you for accommodations, please contact the Center for Access and Accommodations at access@cod.edu. Staff from the Center can help you better understand if your situation qualifies you for an accommodation.
- If you are student who is registered with the Center for Access and Accommodations, please send me your Letter of Accommodation as soon as possible.
- Please do not send me personal medical records or similar personal documents.

The College of DuPage is committed to the equitable access of educational opportunities for students with disabilities in accordance with The Americans with Disabilities Act, As Amended and Section 504 of the Rehabilitation Act of 1973. Any student who feels they may need an accommodation on the basis of an illness, injury, medical condition, or disability should contact the Center for Access and Accommodations to determine eligibility for accommodations and to obtain an official Letter of Accommodation. The Center for Access and Accommodations can be reached via email at access@cod.edu. Students may also initiate a request for services by going to www.cod.edu/access and clicking on the green box labeled "complete form to request accommodations." If you are already registered with the Center for Access and Accommodations, please email me your Letter of Accommodation as soon as possible. Please DO NOT send any private health documentation or Doctor's notes to me.