MATH-2134-001: SYLLABUS

1. Course Information

- Course Title: Calculus for Business and Social Science
- Course Number: 2134
- Credit Hours: 4; Clinical Hours: 0; Lecture Hours: 4; Lab Hours: 0
- Meet Times: Tuesday and Thursday from 9:00 am to 10:50 am
- Meet Location: BIC 2465
- Course Description: Students will be introduced to basic concepts of differential and integral calculus. This course is intended for students planning to major in business, or the behavioral, social, or biological sciences.
- Repeatable for Credit: NO
- Pre-Enrollment Criteria: N/A
- Prerequisite: MATH 1431 Precalculus I with a grade of "C" or better, or equivalent or a qualifying score on the mathematics placement test.

2. Instructor Information

- Name: Michael McCabe, M.S.
- Email: mccabem85@cod.edu
- Office: 3436B, Teams, or Blackboard Collaborate
- Office Phone: 630 942 2152

- Office Hours: Labeled on Blackboard (always available by appointment)

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3. General Course Objectives

(1) Solve exponential, polynomial, rational, and logarithmic equations
(2) Analyze functions
(3) Graph functions
(4) Construct mathematical models
(5) Apply limit theorems and algebraic techniques to evaluate limits
(6) Differentiate functions and equations
(7) Analyze properties of functions using derivatives
(8) Solve application problems using derivatives
(9) Determine extrema of functions of several variables
(10) Determine antiderivatives using the rules of integration
(11) Solve application problems using the fundamental theorem of calculus

4. Topical Outline

(1) Functions
   (a) Power and exponential functions
   (b) Polynomial functions
   (c) Rational functions and asymptotes
   (d) Natural logarithms

   (e) Graphing
(2) Differential calculus
   (a) Limits and continuity
   (b) Derivative process
   (c) Derivative rules for products and quotients
   (d) The chain rule
   (e) Higher order derivatives
   (f) Maxima and minima of functions of one variable
   (g) Functions of more than one variable
   (h) Maxima and minima for functions of more than one variable
   (i) Maxima and minima using Lagrange multipliers
   (j) Applications from business, biology, and other areas
(3) Integral calculus
   (a) Anti-derivatives including substitution and parts
   (b) Area and the definite integral
   (c) Fundamental theorem of calculus
   (d) Improper integrals
   (e) Numerical integration (optional)
   (f) Applications

5. Required Texts, Materials, and Supplies

- Textbook: OER Business Calculus Textbook provided by Michael McCabe
- Homework: Homework will be accessed through Blackboard.
- Notebooks: Highly suggest two separate notebooks. One for taking notes in class and one for working out problems for homework.

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6. Schedule

Unit One: Instantaneous Rate of Change Using Limits
(1) Functions and their average rate of change.
(2) Intuitive and ϵ-δ definition of the limit.
(3) Evaluating limits numerically, geometrically, and algebraically.
(4) Evaluating one-sided limits.
(5) Definition of continuous functions.
(6) Functions and their instantaneous rate of change using limits.
(7) Limit definition of the derivative.
(8) Equations of tangent lines.
(9) **No Class on September 4th (not applicable for our class).**
(10) **Exam 1 September 14th**

Unit Two: Derivative Rules
(1) Power Rule
(2) Product Rule
(3) Quotient Rule
(4) Logarithm and Exponential Rule
(5) Chain Rule
(6) Business Models
   (a) Marginals
   (b) Elasticity of Demand

(7) Implicit and Logarithmic Differentiation
(8) Related Rates Problems
(9) **No Class on October 10**
(10) **Exam 2 October 12**

Unit Three: More Applications of the Derivative
(1) Definition of the critical point of a function.
(2) Intervals of increasing and decreasing functions.
(3) Intervals of concavity of functions.
(4) The first and second derivative test for relative extremes.
(5) Absolute extremes of functions.
(6) Solving optimization problems.
(7) Linearization and Differentials
(8) Curve Sketching
(9) **Last Day to Withdraw on November 12.**
(10) **Exam 3 on November 9th.**

Unit Four: Fundamental Theorem of Calculus (FTC)
(1) Approximate area under curves by using partial Riemann Sums.
(2) Introduction of Integral notation.
(3) Definite integrals and exact area under curves using the limit.
(4) FTC (Part One and Two)
(5) Anti-Derivatives
  (a) "Reverse Power Rule"
  (b) "Reverse Chain Rule" (u-sub)
  (c) "Reverse Product Rule" (product rule)
(6) Application of FTC
  (a) Definite and Indefinite integrals
  (b) Net change formula
  (c) Exact cost/revenue/profit for a single unit.
  (d) Consumer Surplus and Producer Surplus

Unit Five: Partial Derivatives and Lagrange Multipliers
(1) First and Second order partial derivative methods.
(2) Finding critical points for multi-variable functions.
(3) Find relative extremes for multi-variable functions (or saddle points).
(4) Cobb-Douglas and other business problems.
(5) Lagrange Multipliers to find extremes of functions with constants.
  (a) Two variable one constraint.
  (b) Three variable one or two constraints.
(6) **Fall Break November 22 to 26 (No Class).**
(7) **Final Exam on December 13.**

7. Method of Evaluation

- Final Exam (worth 20%)
- Three Exams (worth 40%)
  - No drops and no retakes
- Online Homework (worth 30%)
  - Drop at least 3 assignments
- Extra Assignments (worth 10%)
  - Drop at least 3 assignments

- Extra "Turn-In" assignments will be graded on correctness with no partial credit but unlimited attempts and hard due date.
- Extra "In-Class" assignments will be graded on participation with soft due date.

Grade Scale:

A: 85% and above
B: 75% to 84%
C: 65% to 74%
D: 55% to 64%
F: less than 54%

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8. 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.

9. Access and Accommodations

- As a course policy, I do not accept late work/make up for My Open Math 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.
- Here is a to start the process for accommodations: Center for Access and Accommodations Intake Form (https://cod-accommodate.symplicity.com/public_accommodation/).

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.

10. Withdraw 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