ORIGINAL COURSE IMPLEMENTATION DATE:	September 2010
REVISED COURSE IMPLEMENTATION DATE:	September 2020
COURSE TO BE REVIEWED: (six years after UEC approval)	January 2020

Course outline form version: 09/15/14

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: MATH 141	**Number of Credits:** 3 Course credit policy (105)
Course Full Title: Calculus for Business **Course Short Title (if title exceeds 30 characters):**	
Faculty: Faculty of Science	**Department (or program if no department):** Mathematics and Statistics

Calendar Description:

Functions used in business, economics, and social science are analyzed, using techniques of single-variable differential and integral calculus, and the applications of these results are interpreted. Topics include optimization, curvature analysis, related rates, marginal analysis, linear approximation, and approximation of total change and average value by antidifferentiation and the Fundamental Theorem of Calculus.

Prerequisites (or NONE):	One of the following: (B or better in Calculus 12) or (C+ or better in one of Principles of Mathematics 12, Pre-calculus 12, MATH 096, or MATH 110) or (C+ or better in both MATH 094 and 095) or (C or better in MATH 092 or MATH 140) or (a score of 17/25 or better on Part B of the MSAT together with a score of 34/50 or better on Parts A and B combined).
Corequisites (if applicable, or NONE):	NONE
Pre/corequisites (if applicable, or NONE):	NONE

Equivalent Courses (cannot be taken for additional credit)

Former course code/number: **MATH 115**

Cross-listed with:

Equivalent course(s): *Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.*

Transfer Credit

Transfer credit already exists: ☒ Yes ☐ No

Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☐ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☒ Yes ☐ No

Total Hours: 50

Typical structure of instructional hours:

Lecture hours	50
Seminars/tutorials/workshops	
Laboratory hours	
Field experience hours	
Experiential (practicum, internship, etc.)	
Online learning activities	
Other contact hours:	
Total	**50**

Special Topics

Will the course be offered with different topics?
☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 36

Expected frequency of course offerings (every semester, annually, every other year, etc.): Annually

Department / Program Head or Director: Ian Affleck	**Date approved:**	December 2019
Faculty Council approval	**Date approved:**	January 24, 2020
Campus-Wide Consultation (CWC)	**Date of posting:**	March 20, 2020
Dean/Associate VP: Lucy Lee	**Date approved:**	January 24, 2020
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	April 24, 2020

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Compute asymptotic limits and limiting difference quotients of simple functions numerically
2. Estimate tangent slopes graphically and estimate instantaneous rates of change numerically
3. Translate between tangent slope, instantaneous rate of change, and derivative notation
4. Describe derivative functions graphically, numerically, and algebraically
5. Apply techniques of differentiation (including product, quotient and chain rules) to compute the derivatives of functions built from polynomial, exponential, and logarithmic expressions
6. Apply derivatives to approximate function values and solve applied problems in optimization, related rates, and marginal analysis
7. Compute antiderivatives of basic functions
8. Use definite integrals to compute area under a curve, total change, and average value; both algebraically and with the aid of technology
9. Interpret all results in the field of interest from which the model being analyzed arose

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

Students will learn to use graphing calculators as a tool for plotting and analyzing functions

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☐

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	Bittinger et al	Calculus and its Applications, 2nd custom ed. for UFV	☐	Pearson	2016
2.			☐		
3.			☐		

Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

Texas Instruments graphing calculator (TI-83, TI-83Plus, TI-84, TI-85, or TI-86) is required.

Typical Evaluation Methods and Weighting

Final exam:	40%	Assignments:	15%	Midterm exam:	%	Practicum:	%
Quizzes/tests:	45%	Lab work:	%	Field experience:	%	Shop work:	%
Other:	%	Other:	%	Other:	%	Total:	100%

Details (if necessary): Students must obtain at least 40% on the final exam to pass the course, regardless of term grades.

Typical Course Content and Topics

1. Limits, continuity, differentiability:
   (a) Examining asymptotic limits, graphically and numerically
   (b) Numerically estimating limiting difference quotients
2. The derivative:
   (a) The numerical derivative as a tangent slope and as an instantaneous rate of change
   (b) Derivative functions
   (c) Using the graph of a function to graph its derivative
3. Techniques of differentiation:
   (a) Constant, constant multiple, sum and difference rules
   (b) Product and quotient rules
   (c) The chain rule
   (d) Second-order derivatives
4. Applications of differentiation:
   (a) Optimization
   (b) Marginal analysis
   (c) Curvature and inflection points
   (d) Linear approximation of change
   (e) Related rates
5. Integration:
   (a) The definite integral and its connection to area and total change.
   (b) Accumulation functions
   (c) The Fundamental Theorem of Calculus
   (d) Average value of a function