UNIVERSITY OF THE FRASER VALLEY

OFFICIAL UNDERGRADUATE COURSE OUTLINE (page 1)

COURSE IMPLEMENTATION DATE:	September 2010
COURSE REVISED IMPLEMENTATION DATE:	January 2014
COURSE TO BE REVIEWED:	January 2020
(six years after UEC approval)	*(month, year)*

OFFICIAL UNDERGRADUATE COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department – see course syllabus available from instructor

MATH 141	Science/Mathematics & Statistics	3
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UFV CREDITS

Calculus for Business

COURSE DESCRIPTIVE TITLE

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. Single-variable differential calculus topics include optimization, curvature analysis, related rates, marginal analysis, and linear approximation. Single-variable integral calculus topics include approximating total change and average value by antidifferentiation and the Fundamental Theorem of Calculus. Many single-variable applications make use of piecewise continuous models that are built from real data.

Note: Students with credit for MATH 111 or MATH 115 cannot take this course for further credit.

PREREQUISITES: One of the following: (C+ or better in one of Foundations of Mathematics 12, Precalculus 12, Principles of Math 12, MATH 096, or MATH 110) or (C+ or better in both MATH 094 and 095) or (C or better in 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:

PRE or COREQUISITES:

SYNONYMOUS COURSE(S):

(a) Replaces: MATH 115

(b) Cross-listed with:

(c) Cannot take: MATH 111 for further credit.

SERVICE COURSE TO: *(department/program)*

TOTAL HOURS PER TERM: 45

STRUCTURE OF HOURS:

Lectures:	45	Hrs
Seminar:		Hrs
Laboratory:		Hrs
Field experience:		Hrs
Student directed learning:		Hrs
Other (specify):		Hrs

TRAINING DAY-BASED INSTRUCTION:

Length of course: N/A

Hours per day: N/A

OTHER:

Maximum enrolment: 36

Expected frequency of course offerings: Annually

(every semester, annually, every other year, etc.)

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only) ☒ Yes ☐ No

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE: ☐ Yes ☒ No

Course designer(s):	**Ian Affleck**		
Department Head:	**Cindy Loten**	Date approved:	**April 29, 2013**
Campus-Wide Consultation (CWC)		Date of meeting:	**n/a**
Curriculum Committee chair:	**Dave Fenske**	Date approved:	**June 21, 2013**
Dean/Associate VP:	**Lucy Lee**	Date approved:	**June 21, 2013**
Undergraduate Education Committee (UEC) approval		Date of meeting:	**September 27, 2013**

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 analysed arose

METHODS: *(Guest lecturers, presentations, online instruction, field trips, etc.)*

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

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)

☒ Other (specify): Course Challenge

☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS: *[Textbook selection varies by instructor. Examples for this course might be:]*

Hoffman and Bradley, Calculus for Business, Economics, and the Social and Life Sciences, 8th edition, McGraw-Hill, 2004
Warner and Costenoble, Applied Calculus, 3rd edition, Thomson, 2004
Barnett, Ziegler and Byleen, Calculus for Business, Economics, Life Sciences and Social Sciences, 11th edition, Pearson, 2008
Lial, Greenwell and Ritchey, Calculus with Applications, 8th edition, Pearson, 2005

SUPPLIES / MATERIALS:

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

STUDENT EVALUATION: *[An example of student evaluation for this course might be:]*

Progress will be evaluated with regular short tests and/or assignments, one or more midterms, and a 3-hour comprehensive final exam.

Quizzes, assignments and projects	30%
Term tests	30%
Final exam	40%*

* Students must obtain at least 40% on the final exam to pass the course, regardless of term grades.

COURSE CONTENT: *[Course content varies by instructor. An example of course content might be:]*

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

Course content continued:

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