



COURSE IMPLEMENTATION DATE: September 2010
 COURSE REVISED IMPLEMENTATION DATE: September 2013
 COURSE TO BE REVIEWED: March 2015
(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

<u>MATH 141</u>	<u>Science/Mathematics & Statistics</u>	<u>3</u>
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UFV CREDITS
<u>Calculus for Business</u>		
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 may receive credit for only one of MATH 111 or MATH 141 (formerly MATH 115).

PREREQUISITES: One of the following: C+ or better in one of Foundations of Mathematics 12, Precalculus 12, Principles of Math 12, 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)
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:

Yes No
 Yes No

Course designer(s): <u>Ian Affleck</u>	Date approved: <u>December 15, 2011</u>
Department Head: <u>Greg Schlitt</u>	Date of meeting: <u>February 3, 2012</u>
Supporting area consultation (Pre-UEC)	Date approved: <u>January 27, 2012</u>
Curriculum Committee chair: <u>Norm Taylor</u>	Date approved: <u>February 10, 2012</u>
Dean/Associate VP: <u>Ora Steyn</u>	Date of meeting: <u>March 2, 2012</u>
Undergraduate Education Committee (UEC) approval	

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