CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	MATH 104	Course Title	Differential Calculus with Applications to Commerce and Social Sciences
Credit Value	3	Department	Mathematics and Science

No. of weeks	14	Hrs. per week	Lecture	Tutorial	Laboratory	Total
			4	0	0	4

Course Description	Limits and continuity, derivatives and rates of change, exponential and trigonometric functions and their applications to business and economics, Newton's method, Taylor polynomial and Taylor series, maxima and minima, and graphing. *Note: Students with credit for MATH 151 may not take MATH 104 for further credit.*
Prerequisite(s)	ENGL 088 (formerly EASL 089/ENGL 097), MATH 12 (C+) or MATH 100 (C)

Initial Articulation Targets	UBC	SFU	UVic	UNBC	TRU
	MATH 104 (3)	MATH 157 (3) – Q	MATH 102 (1.5)	MATH 100 (3)	MATH 1140 (3); ALEX MATH 104 (3) & ALEX MATH 105 (3)=TRU MATH 1140 (3) & TRU MATH 1240 (3)
	For updated information on the transferability of this course, please consult the BC Transfer Guide, www.bctransferguide.ca				

Learning Outcomes	Upon successful completion of this course, the student will be able to: • Evaluate problems on the concept of limits using appropriate techniques (algebraic, numerical and graphical) including L'Hospital's rule. • Determine the continuity of a function at a point or on intervals, and find the points of discontinuity (from equations and graphs). • Interpret the derivative of a function at a point as the instantaneous rate of change, and as the slope of the tangent line. • Apply appropriate differentiation rules and techniques (including chain rules and implicit differentiation) to obtain derivatives of various functions (common algebraic, exponential, logarithmic and trigonometric). • Calculate the derivative of a function to determine where it is increasing or decreasing, and its relative maxima, minima and inflection points, as well as any asymptotes. • Sketch graphs of selected functions (e.g., polynomial, rational, exponential and logarithmic) from given information.

	• Solve problems in marginal analysis (marginal cost, marginal revenue, and marginal profit), optimization, growth & decay, and related rates with business and social sciences applications by calculating the derivative. • Solve problems relating to linear approximations and, Newton's Method, Taylor polynomial and Taylor series by calculating derivatives. • Compute antiderivatives of basic functions.
Content	**Core** topics – all of the following will be covered: • Precalculus review • Limits and continuity • The derivative (definition of derivative and derivative as a rate of change) • Calculating derivative (techniques of finding derivatives, including the derivative of exponential, logarithmic, and trigonometric functions). • Graphs and derivative (increasing, decreasing functions, relative and absolute extrema, higher order derivative, concavity and curve sketching. • Applications of derivatives (application of extrema, elasticity of demand, implicit differentiation and related rates of linear approximation, Newton's method, Taylor polynomial, and Taylor series). • Antiderivative (of basic functions). Additional topics may also be covered, at the discretion of the instructor.
Methods of Instruction	Lectures, problem sessions and assignments
Required Textbook(s)	The following textbook(s) is/are required, or approved equivalent(s). Calaway, Shana et al. Applied Calculus. 12th Ed. OpenTextBookStore, 2014. Lial, Margaret, Raymond Greenwall and Nathan Ritchey. Calculus with Applications. 12th Ed. Pearson Publishing, 2022. Strang, Gilbert and Edwin Herman. Calculus Volume 1. OpenStax, 2022.
Required Equipment and Technology	Students are required to have a computer with internet access. The following resources are provided by the College: • Office 365 • Student email
Homework Hours	At minimum, students can expect one hour of homework for every hour of instructional time.
Evaluation		*Component*	*% Value*
Assignments, in-class activities, participation	10-30%
Quizzes (weekly, biweekly, module, chapter)	10-30%
Midterm examination(s)	20-30%
Final examination	30-35%	

Completion Requirements	The minimum grade to pass this course is D (50%). Unless otherwise stated, a minimum grade of C- (55%) is required for this course to fulfil a prerequisite.

Course Designer(s)	Len Berggren, Ph.D., Department of Mathematics, Simon Fraser University	Consultant(s), *if applicable*	BC Committee on the Undergraduate Program in Math and Statistics (BCCUPMS)
Dean's Approval	Barbara Moon, Ph.D., Dean of Arts and Sciences, Alexander College	Dean's Approval Date	September 27, 2006
Curriculum Committee Approval Date	September 27, 2006	First Term Offered	Fall 2008
Last Review Date	March 1, 2023	Next Review Date	March 1, 2028

Revision History	October 24, 2012-New prerequisite, MATH 12 (C+)
	May 1, 2014-All MATH and STAT courses will be 4 hours, commencing Fall 2014, per SASC.
	January 5, 2015-Revised by Len Berggren, Mathematics faculty
	March 1, 2023-Minor updates (e.g., assessment ranges, textbooks) by Kelly Cheung and Krishna Subedi