

MAKERERE UNIVERSITY
MAKERERE UNIVERSITY BUSINESS SCHOOL
FACULTY OF ECONOMICS, ENERGY AND MANAGEMENT SCIENCE
DEPARTMENT OF APPLIED STATISTICS AND MANAGEMENT SCIENCE

Course Name: BUSINESS CALCULUS

Course Code: BBM 1104

Course Level: I

Credit Units: 4

Credit Hours: 60

1. Course Description

This course will introduce the importance of calculus in business and also make students familiar with a wide variety of mathematical concepts. Furthermore, it is also designed to present a thorough, easily understood introduction to mathematical functions with applications to business problems. Among other topics, the course introduces the students to properties of functions, differential, integral and vector calculus.

2. Course objectives

During the semester the student will undergo instruction on:

- i) The basic mathematical concepts and methods.
- ii) The basic mathematical functions used in business management.
- iii) Computation of limits, derivatives, and integrals.
- iv) Analysis of functions using limits, derivatives, and integrals.
- v) Recognition of the appropriate tools of calculus to solve business problems.

3. Learning outcomes

By the end of this course unit, the students should be able to:

- i) Apply the different mathematical theories and application of those theories in the business situations.
- ii) Use functions and associated concepts like limit, derivative and integral in business concepts and management.
- iii) Use differential and integral calculus in business computations.
- iv) Determine the appropriate tools of calculus to solve business problems.

4. Course Content

Topics	Sub-topics	Hours	Lecturer
Introduction, Terminology, and Tools	Concepts Meaning and Importance of Business Mathematics The real number system Constants, Variables, Parameters and Coefficients Functions (General and specific functions) Graphs, Slopes and Intercepts Inverse Functions	8	Brenda Kyasiimire
Functions	Definition of a function Properties of functions Polynomials (linear and quadratic) rational Composite functions Transcendental, Logarithms and Exponential functions; Properties and their inverses Limit of function and continuity One-sided limits; removable discontinuity Applicability of functions in business	12	Brenda Kyasiimire
Differential calculus	Definition of a derivative, continuity and differentiability The derivative and the slope of a curve Rules and or/theorems for determining derivatives Inverse functions rules; their derivatives and graphs Application to approximation Rolle's Theorem, Mean Value Theorem (Cauchy's Mean Value Theorem) Taylor's Theorem and application First Derivatives test for Maximum and Minimum Values and Sketch Graphs Second Derivatives test for Maximum and Minimum	20	Peter Ssemwezi

	Values and Sketch Graphs Graph Sketching: Asymptotes and Rational Functions Using Derivatives to Find Absolute Maximum and Minimum Values Maximum – Minimum Problems: Business and Economics Applications Marginal and Differentials Implicit Differentiation and Related Rates Derivatives of Exponential and Logarithmic Functions and Applications: Uninhibited and Limited Growth Models, decay		
Vector Calculus	Functions of Several Variables Partial Derivatives Concavity and Convexity Lagrange Multipliers. Constrained Optimization.	8	Brenda Kyasiimre
Integral Calculus	The Area under a Graph Area, Antiderivatives, and Integrals Area and Definite Integrals Properties of Definite Integrals Definite integration Rules of integration Integration by substitution Integration by parts Business applications Improper integrals - Infinite limits of integration - Infinite integrand	12	Naome Akamumpa

5. Mode of delivery

- Straight class lectures.
- Class presentations, group work and assignments.
- Tutorials.

6. Mode of Assessment

- Coursework 1 and 2 30%
- End of Semester Examination 70%

7. Reading List

- Chiang. C, (2005), Fundamental Methods of Mathematical Economics, (4th Ed.), McGraw-Hill Education.
- Dowling, E. T, (1980), Schaum's Outline series of Theory and Problems of Mathematics for Economists, (3rd Ed.)
- Hass, J. R., Heil, C. E., Weir, M. D. (2017) Thomas' Calculus (14th Ed.), Pearson
- Jacques, I., (2006), Mathematics for Economics and Business, (6th Ed.), Prentice Hall.
- Lial, M. L., Greenwell, R. N, Ritchey, N. P. (2015). Calculus with Applications (11th Ed.), Pearson
- Render, Stair & Hanna (2011), Quantitative Analysis for Management, 11th Ed. Prentice Hall.