MAKERERE UNIVERSITY

MAKERERE UNIVERSITY BUSINESS SCHOOL

FACULTY OF ECONOMICS, ENERGY AND MANAGEMENT SCIENCE

DEPARTMENT OF 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 mathematics 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 basics 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 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, Concepts and Tools	Meaning and Importance of Business Mathematics	8	Brenda Kyasiimire
	The real number system		
	Constants, Variables, Parameters and Coefficients		
	Functions (General and specific functions)		
	Graphs, Slopes and Intercepts		
	Inverse Functions		
Functions	Definition of a function	12	
	Properties of functions		
	Polynomials (linear and quadratic) rational		Brenda Kyasiimire
	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		
Differential calculus	Definition of a derivative, continuity and differentiability	20	Brenda Kyasiimire
	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		

	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	Dr. Eng. Turinawe Dickinson
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	Dr. Eng. Turinawe Dickinson

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.