KARATINA UNIVERSITY
SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS, STATISTICS & ACTURIAL SCIENCES
COURSE OUTLINE

Unit Code:	**MAT 116**
Unit Title:	Calculus I
Program(s):	E100 E103 E111 E112
Year and Semester	Y1S1
Lecturer Name:	Ms. Beryl Ang'iro
Lecturer Contacts:	Email: bangiro@karu.ac.ke

Expected Learning Outcomes

By the end of the lesson the learner should be able to

1. Explain concepts in Limits and Continuity.
2. Illustrate the concept of derivative on graphs.
3. Determine derivative of different functions.
4. Apply the concept of derivative to various application fields.

Course Content

Limits. Continuity and differentiability; Differentiation of functions of single variable; Chain rule for derivatives, Parametric and implicit differentiation.; Applications of differentiation maxima and minima; Rolle's Theorem.

Lecture Schedule

WEEK	TOPIC	SUB – TOPIC	REQUIREMENTS
1	**LIMITS AND CONTINUITY**	• The limit of a function: definition.	

		• Graphical and algebraic evaluation of limit. • Limits of rational functions. • Calculating limits using the limit laws.	
2	**LIMITS AND CONTINUITY**	• One sided limits, Infinite limits; Limits at infinity; • Asymptotes: horizontal/vertical asymptotes. • Limits of trigonometric functions. • The formal definition of a limit. • Continuity and limits. • Discontinuity: definition, determination, types	
3	**DIFFERENTIATION**	• The derivative: Differentiating from first principles; • Differentiation rules: Power rule, Addition rule, Subtraction rule.	
4		• Differentiation rules: Product; quotient and chain rules.	
5	**DIFFERENTIATION**	• Derivatives of exponential functions, logarithm functions.	
6	**C.A.T ONE**	**CAT ONE AND ITS REVISION** **Covers all of the above areas**	
7		• Trigonometric functions and Hyperbolic functions. Derivatives of inverse trigonometric functions.	
8	**DIFFERENTIATION**	• Derivatives of Parametrically defined curves. • Implicit differentiation • Second and higher order derivatives.	
9	**APPLICATIONS OF DIFFERENTIATION**	• Linear motion: Displacement; velocity and acceleration problems.	

		• Derivatives in economics: marginal costs and marginal revenue. • Derivatives and horizontal, vertical, and slant asymptotes. • Intervals where a function is increasing or decreasing	
10	**APPLICATIONS OF DIFFERENTIATION**	• Extrema: maximum and minimum points; evaluation using first and the second derivatives; points of inflection. • Optimization problems: business and geometry.	
11	**C.A.T TWO**	**CAT TWO AND ITS REVISION Covers everything done after the first CAT.**	
12		• Concavity: determining concavity using 1st and 2nd order derivatives. • The Rolle 's Theorem and Mean Value Theorem.	
13		• Curve sketching.	
14		STUDENTS REVISION	
15& 16	END OF SEMESTER EXAM		

INSTRUCTIONAL MATERIAL

Main Text Book

1. Calculus and Analytic Geometry. Thomas/Finney 6th edition
2. Calculus Single Variable. Stewart 3rd Edition

Was the course outline issued on the first lecture **Yes** _____ **No** _____

Lecturer: Ms. Beryl Ang'iro **Sign:** **Date: 27/08/2024**

Class rep _____ **Sign:** _____ **Date:** _____

Approved for circulation by

HOD: Dr. Daniel Achola **Sign:** _____ **Date:** _____