Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

Applied Mathematics

GENEA402 Apply Elementary Mathematical Analysis

Competence

RQF Level: 4

Learning Hours 60

Credits: 6

Sector: ARTS AND CRAFTS

Trade: Fashion design, Fine and Plastic Arts, Music and Performing Arts

Module Type: General

Issue Date: May 2023

CURRICULUM: GENEA402-TVET CERTIFICATE 4 - ARTS AND CRAFTS

Purpose statement	This general module describes the knowledge, skills and attitude required to apply elementary mathematical analysis. At the end of this module, the learner will be able to apply numerical and graphical methods to display data; analyze algebraic functions and apply fundamental of differentiation.					
Delivery modality	**Training delivery**		**100%**	**Assessment**		**Total 100%**
	Theoretical content		30%	Formative assessment	30%	50%
	Practical work:		70%		70%	
	• Group project and presentation	20%				
	• Individual project /Work	50%				
				Summative Assessment		50%

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Apply numerical and graphical method to display data	1.1 Ungrouped quantitative data is adequately plotted based on established conditions
	1.2 Measures of central tendency are accurately determined according to definitions and calculations
	1.3 Measures of dispersion are correctly determined in accordance with to definitions and calculations
2 Analyze algebraic functions	2.1 The domain and range of algebraic function are accurately determined based on existence condition.
	2.2 Symmetry (parity) of algebraic function is adequately identified based on definitions of key words (even and odd).
	2.3 Limits of a function are correctly determined based on theory of calculating limits.
	2.4 The asymptotes are accurately determined based on limits calculation.
3 Apply fundamentals of differentiation	3.1 Derivative is properly determined by using definition.
	3.2 Derivative of a function is adequately interpreted by illustrating a curve with its tangent and secant line.
	3.3 Derivative is appropriately applied based on definitions and calculation
	3.4 Curve of an algebraic function is accurately sketched based on the table of variation

Course content

Learning outcomes	At the end of the module the learner will be able to: 1. Apply numerical and graphical methods to display data 2. Analyze algebraic functions 3. Apply fundamentals of differentiation
Learning outcome 1: Apply numerical and graphical methods to display data	**Learning hours: 10**

Indicative content

- **Plotting ungrouped quantitative data**
  - ✓ Pie diagrams
  - ✓ Horizontal bar charts
  - ✓ Vertical bar chats
- **Determination of measures of central tendency**
  - ✓ Mode
  - ✓ Mean
  - ✓ Median
- **Determination of measures of dispersion**
  - ✓ Range
  - ✓ Variance
  - ✓ Standard deviation
  - ✓ Coefficient of variation

Resources required for the learning outcome

Equipment	Black/white board, computer, projector
Materials	Reference books ,Geometric instrument, piece of chalk/ markers
Tools	Hand-out notes , Manilla paper, scientific calculator, Internet
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Documentary Research
Formative assessment methods	• Written assessment

Learning outcome 2: Analyze algebraic functions	Learning hours: 20

Indicative content

- **Determination of the domain and range of algebraic function**
  - ✓ Existence condition
  - ✓ Domain of definition of a function
  - ✓ Range of a function
- **Identification of symmetry of algebraic function**
  - ✓ Even function
  - ✓ Odd function
- **Determination of function limits**
  - ✓ Finite limits
  - ✓ Infinite limits
  - ✓ Limit at infinity
  - ✓ Remove of indeterminate cases
    - $\frac{0}{0}$
    - $\frac{\infty}{\infty}$
    - $0 \cdot \infty$
    - $\infty - \infty$
- **Determination of asymptotes**
  - ✓ Rational functions

Resources required for the indicative content	
Equipment	Black/white board, computer, projector
Materials	Reference books, , piece of chalk/ marker s
Tools	Manilla paper, scientific calculator, Hand-out notes, Internet, Geometric instrument
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion
Formative assessment methods	• Written assessment

Learning outcome 3: Apply fundamentals of differentiation	Learning hours: 30
Indicative content	

- **Determination of derivatives**
  - ✓ Derivative of function at a given point
  - ✓ Derivative of a polynomial function
  - ✓ Derivative of a rational
  - ✓ Successive derivatives

- **Interpretation of derivative of a function**
  - ✓ Geometric interpretation
  - ✓ Kinematical meaning of a derivative
- **Application of derivative**
  - ✓ Determination of equation of tangent and normal lines at a given point
  - ✓ Increasing and decreasing intervals for a function
  - ✓ Maximum and minimum points of a function
  - ✓ Concavity, inflection point on a graph
- **Sketching curve of algebraic function**

  - ✓ **Establishing required parameters**
    - Variation table
    - Additional points
  - ✓ Sketching graph of polynomial function
  - ✓ Sketching graph of rational function

Resources required for the indicative content	
Equipment	Black/white board, Hand-out notes, Reference books,Internet
Materials	Reference books ,piece of chalk/ markers
Tools	Manilla paper, scientific calculator, Hand-out notes, Geometric instrument ,Internet
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Trainer guided • Group discussion
Formative assessment methods	• Written assessment

References:

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