Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

Applied Mathematics

GENEP502

Apply Logarithms, Exponential Equations and Probability

Competence

RQF Level: 5

Learning Hours
60

Credits: 6

Sector: ARTS AND CRAFTS, HOSPITALITY AND TOURISM

Trades: Fashion design, Fine and Plastic Arts, Music and Performing Arts, Food and Beverages Operations, Front Office and Housekeeping operations, Tourism

Module Type: General

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<table>
<tr><td>Purpose statement</td><td colspan="5">This general module describes the knowledge, skills and attitudes required to apply logarithmic, exponential equations and probability. At the end of this module, the learner will be able to apply logarithm, exponential and probability.</td></tr>
<tr><td rowspan="6">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group project and presentation</td><td>20%</td></tr>
<tr><td>• Individual project /Work</td><td>50%</td></tr>
<tr><td colspan="3"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
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Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Solve exponential and logarithmic equations	1.1 Properties for exponential expressions are correctly described based on their types.
	1.2 Properties for logarithmic expressions are correctly described based on their types.
	1.3 Exponential equation is correctly solved according to domain of validity.
	1.4 Logarithmic equations are correctly solved based on domain of validity.
2 Apply exponential and logarithmic expression	2.1 Problems are correctly solved related to compound interest
	2.2 Problems are properly solved related to population growth
	2.3 Problems are properly solved related to population decay
3. Apply fundamentals of probabilities	3.1 Counting techniques are appropriately applied based on a given experiment
	3.2 Probabilities are properly computed based on definition and counting techniques
	3.3 Conditional probability is correctly calculated in line with given experiment.

Course content

Learning outcomes	At the end of the module the learner will be able to: 1. Solve exponential and logarithmic equations 2. Apply exponential and logarithmic expression 3. Apply fundamentals of probabilities

Learning outcome 1: Solve exponential and logarithmic equations	**Learning hours: 10**

Indicative content

- **Description of properties for exponential expressions**
  - ✓ Definition of exponential expressions
  - ✓ Evaluation of exponential expression
  - ✓ Application of properties of exponential expressions
- **Description of properties for logarithmic expression**
  - ✓ Definition of logarithmic expression
  - ✓ Change of base
  - ✓ Evaluation of logarithmic expression
  - ✓ Application of properties of logarithmic expressions
- **Solving exponential equation**
  - ✓ Domain of validity
  - ✓ Solving exponential equation
    - Using like bases
    - Using logarithms
- **Solving logarithmic equations**
  - ✓ Domain of validity
  - ✓ Solving logarithmic equations
    - Using definition
    - Using one to one logarithmic property

Resources required for the learning outcome

Equipment	Projector, computer
Materials	Reference books , Black board, Didactic materials, Marker pen
Tools	Hand-out notes, , Internet
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment

Learning outcome 2: Apply exponential and logarithmic expression	**Learning hours: 20**

Indicative content

- **Solving problems related to compound interest**

✓ Description of Compound interest
- Principle value
- Future value
- Time

- Rate of change

✓ Calculation of Compound interest
- Principle value
- Future value
- Time
- Rate of change

- **Solving problems related to population growth**

✓ Description of Population growth
- Initial population
- Future population
- Time
- Rate of growth

✓ Calculation of Population growth
- Initial population
- Future population
- Time
- Rate of growth

- **Solving problems related to population decay**

✓ Description of population decay
- Initial population
- Future population
- Time
- Rate of decay

✓ Calculation of Compound interest
- Initial population
- Future population
- Time
- Rate of decay

Resources required for the indicative content	
Equipment	Computer, projector,
Materials	Reference books,chalkboard ,Didactic materials such as manila paper, Marker pen
Tools	Hand-out notes, internet
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment

Learning outcome 3: Apply fundamentals of probabilities	**Learning hours: 30**

Indicative content
• **Application of counting techniques** ✓ Venn diagram ✓ Tree diagram ✓ Multiplication principle ✓ Permutations ✓ Combination • **Computation of probabilities** ✓ Definition of terminologies Random experiment Sample space Events Complementary event Probability of event under an equally likely event Inclusive events Mutually exclusive events ✓ Calculation of probabilities Simple event Complementary event Event under an equally likely event Inclusive events Mutually exclusive events • **Calculation of the conditional probability** ✓ Conditional probability ✓ Independent events ✓ Probability by tree diagram

Resources required for the indicative content	
Equipment	Computer, projector
Materials	Reference books, Didactic materials
Tools	Hand-out notes, Internet
Facilitation techniques	• Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment

References:

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