

**MINISTRY OF EDUCATION SCIENCE AND TECHNOLOGY**

**INSTITUTE OF ADULT EDUCATION**



**THE ENHANCEMENT OF ACCESS AND QUALITY TO SECONDARY EDUCATION THROUGH  
ALTERNATIVE EDUCATION PATHWAY (AEP)**

**BASIC MATHEMATICS SYLLABUS  
FOR ALTERNATIVE SECONDARY EDUCATION PATHWAY (ASEP)**

**STAGE I&II**

**2026**

Designed and prepared by;  
Institute of Adult Education  
Dar es Salaam  
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## **1.0 Introduction**

Basic Mathematics Syllabus for Alternative Secondary Education Pathway Programme comprises of both Stage One (Equivalent to Form One and Two) and Stage Two (Equivalent to Form Three and Four) written in a modular format. It has integrated components that originate from formal education syllabus. The integrated syllabus has been prepared to allow learners to complete the course within two years' time. It is designed for learners outside the formal education system to enable them sit for Ordinary Certificate of Secondary Education Examination using acquired competences, both competently and professionally in their daily undertakings. The syllabus uses Competence Based Education and Training (CBET) approach, which is a result based, indicating what a learner is expected to do after completing the course.

## **2.0 Objectives of Education in Tanzania**

The main objectives of education in Tanzania are to enable every Tanzanian to:

- a) Develop and improve his or her personality so as to value himself or herself and develops self-confidence;
- b) Respect the culture, traditions and customs of Tanzania; cultural differences; dignity; human rights; attitudes and inclusive actions;
- c) Advance knowledge to apply science and technology, creativity, critical thinking, innovation, cooperation, communication and positive attitudes for his or her own development and the sustainable development of the nation and the world at large;
- d) Understand and protect national values, including dignity, patriotism, integrity, unity, transparency, honesty, accountability and the national language;
- e) Develop life and work-related skills to increase efficiency in everyday life;
- f) Develop a habit of loving and valuing work to increase productivity and efficiency in production and service provision;
- g) Identify and consider cross-cutting issues, including the health and well-being of the society, gender equality, as well as the management and sustainable conservation of the environment; and
- h) Develop national and international cooperation, peace and justice per the Constitution of the United Republic of Tanzania and international conventions.

### **3.0 Objectives of Secondary Education in Tanzania**

The objectives of Ordinary Secondary Education in Tanzania are to:

- a) Strengthen, broaden and develop a deeper understanding of the knowledge, skills and attitudes developed at the Primary Education level;
- b) Safeguard customs and traditions, national unity, national values, democracy, respect for human and civil rights, duties and responsibilities associated with such rights;
- c) Develop self-confidence and ability to learn in various fields, including science and technology as well as theoretical and technical knowledge;
- d) Improve communication using Tanzanian sign language, tactile communication, Kiswahili and English languages. The learner should be encouraged to develop competence in, at least one other foreign language, depending on the school situation;
- e) Strengthen accountability for cross-cutting social issues, including health, security, gender equality and sustainable environmental conservation;
- f) Develop competence and various skills that enable the learner to employ himself or herself, to be employed and to manage life by exploiting his or her environment well; and
- g) Develop readiness to continue with upper secondary and tertiary education.

### **4.0 Objectives of Secondary Education through Alternative Education Pathway in Tanzania**

The objectives of Secondary Education through Alternative Education Pathway are to;

- a) Provide Equivalent Education to Children, Youths and Adults who could not get the opportunity in the Formal Education System;
- b) Complement government efforts of achieving Education for All (EFA) Objectives;
- c) Cater for youth and adults who dropped out of school due to various reasons; and
- d) Provide education to disadvantaged and marginalized groups including girls.

## 5.0 Main and Specific Competences

The main and specific competences to be developed are presented in Table 1.

**Table 1: Main and Specific competences**

No	Main competences	Specific competences
1.0	Demonstrate mastery of basic concept of mathematics, numbers and sets	1.1 Use numerical skills in different contexts. 1.2 . Apply integers, rational and irrational number, in solving different challenges in life 1.3 Apply fraction, decimals and percentages in life 1.4 Use ratios, proportions, rates and variations in daily life 1.5 Use sets in daily life
2.0	Demonstrate mastery of basic concept in geometry and algebra	2.1 Use approximations in various contexts
3.0	Demonstrate ability to simplify algebraic expressions, solve algebraic equations and draw graphs.	3.1 Solve daily life problems using algebra 3.2 Demonstrate ability to solve linear and simultaneous equations 3.3 Use coordinate geometry skills in daily life 3.4 Demonstrate the mastery on finding gradient and equation of a straight line
4.0	Demonstrate mastery of basic concept in geometry and algebra	4.1 Demonstrate ability to use geometry, congruence, similarity in real life

5.0	Demonstrate ability to use relationships among exponents, radicals, logarithms and solve quadratic equations using different formulae	5.1 Demonstrate the mastery of exponents and radicals in different context 5.2 Demonstrate ability to apply logarithms in daily life
6.0	Demonstrate the ability to use basic coordinate geometry, trigonometry	6.1 Demonstrate the ability to apply trigonometric ratios, angles of elevation and depression in a real
7.0	Demonstrate mastery of basic concepts in geometry and algebra;	7.1 Use geometry, approximations, relations and functions in various contexts 7.2 Use algebra and matrices in problem solving 7.3 Demonstrate ability to apply vector in real life 7.4 Use matrices in problem solving
8.0	Apply the knowledge of sequence, series and circles in real	8.1 Use sequence and series in real life 8.2 Use basic skills of circles in daily life
9.0	Demonstrate mastery of basic concepts in probability and statistics	9.1 Use statistics to solve real life problems 9.2 Use probability in problem solving
10.0	Demonstrate mastery of basic concepts in coordinate geometry, trigonometry	10.1 Use coordinate geometry and trigonometry skills in daily life

## **6.0 Structure of the Syllabus**

The syllabus for Basic Mathematics subject comprises the following components:

**i) Name of the Module**

This implies set of separate units that can be joined together to form a part of a subject course of study.

**ii) Main Competence**

Main competence is the learning outcome that implies what learners do after the completion of the subject course

**iii) Specific Competence**

Specific learning outcome implies what learners are supposed to do after completion of a particular module/unit

**iv) Learning Activities**

These are the observable tasks to be done by teachers and learners in realizing the specific learning outcome.

**v) Learning/Facilitation Strategies**

This part indicates what a facilitator and learners are expected to do in the process of facilitation and learning. This includes self-learning and face to face session.

**vi) Assessment Criteria**

The specific standard or guidelines that outline what is expected of a learner in a particular assessment activity.

**vii) Facilitation/Learning Aids**

These are learning and facilitation materials which are used to support the process of facilitation and learning.

**viii) Estimated Time of Study**

These are proposed hours of learning which can be used for self-study and face to face facilitation.

## **7.0 Number of modules**

This syllabus has two stages which makes a total of 13 modules as shown below;

### **Stage I**

Module 1: Analysing Concepts of Mathematics and Different Types of Numbers

Module 2: Applying Percentage, Fractions, Decimals and Sets to Solve Real Life Problems

Module 3: Estimating Approximations

Module 4: Computing Algebraic Expressions and Solving Algebraic Equations and Inequalities.

Module 5: Calculating Congruence and Similarity

Module 6: Applying Exponents, Radicals, Transposition of Formula, Logarithms and Quadratic Equations in Real Life.

Module 7: Exploring the Basic Concepts of Trigonometry

### **Stage II**

Module 1: Applying Relations, Functions and Linear Programming in Real Life Situations

Module 2: Applying Sequence and Series in Real Life Situations

Module 3: Demonstrating Mastery of the use of Circle Theorems in Real Life

Module 4: Applying Statistics and Probability to solve problems

Module 5: Demonstrating the use of Co-ordinate Geometry and Trigonometry

Module 6: Applying Vectors, Matrices and Transformation in Solving Real Life Related Problems

## **8.0 Further Readings**

A number of books have been suggested for further reading in each module.

## **BASIC MATHEMATICS SYLLABUS STAGE I**

### **COMPETENCES FOR BASIC MATHEMATICS STAGE I**

Upon completion of stage I modules of Basic Mathematics, a learner should be able to:

1. Demonstrate mastery of basic concept of mathematics and numbers
2. Demonstrate ability to compute decimals, fractions, percentage, ratios, proportions, rates, variations and sets
3. Apply the knowledge of approximation in real life situation
4. Computing algebra, algebraic equations, coordinate geometry, equation of a line, graphical solutions of linear simultaneous equations.
5. Demonstrate the ability to work on congruence and similarity practically.
6. Apply the knowledge of exponents, radicals, transposition of formula, logarithms and quadratic equations in real life.
7. Apply trigonometric ratios in solving problems on special angles. Angle of depression and angle of elevation.

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
1. DEMONSTRATING CONCEPT OF MATHEMATICS AND DISTINGUISHING DIFFERENT TYPES OF NUMBERS	1.1 Demonstrate mastery of Mathematics language.	1.1.1 Use numerical skills in different contexts.	a) Explain the basic concepts of Mathematics ( <i>Meaning of mathematics, branches of mathematics, relationship between mathematics and other subjects, importance of mathematics</i> )	<b>i) Library Search:</b> A learner should go to library search on the concept of mathematics.  <b>ii) Self-evaluation:</b> Make self-evaluation on the relationship between mathematics and other subjects <b>iii) Internet search:</b> A learner to browse materials on internet to search for importance of mathematics	<b>i) Brainstorming:</b> Guide a learner to brainstorm on the meaning and branches of mathematics. <b>ii) Group Discussion:</b> Guide learners discuss with colleagues on relationship between mathematics and other subjects. <b>iii) Group Discussion:</b> In small groups, guide learners to describe the importance of mathematics	The basic concept of mathematics is clearly explained  Relationship between mathematics and other subjects is well explained  Importance of mathematics are well described	Number cards, Number charts, Abacus, Ruler, Pencil, Mathematical sets, IAE mathematics module	20 Hours	10 Hours
			b) Apply numbers in daily life. (Place	<b>i) Library Search:</b> Visit library for	<b>i) Role play:</b> Guide learners to conduct role	The place value of each digit in any given			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			value of a number, identify whole, natural, even, odd and prime numbers from other numbers, differentiate numbers)	<p>searching materials on place value of digit in any given number</p> <p><b>ii) Skimming:</b> A learner should go through different materials then practice on how to apply given numbers in words and numerals</p> <p><b>iii) Internet Search:</b> A learner should browse materials in internet search on numbers</p>	<p>play on place value of digit in any given number</p> <p><b>ii) Think pair share:</b> Guide learners to share experiences on the application of numbers in daily life</p> <p><b>iii) Think pair - share:</b> Guide learners to share experiences on numbers</p>	<p>number is correctly written.</p> <p>whole, natural, even, odd and prime numbers from other numbers are correctly identified</p>			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		1.1.2 Apply integers, rational and irrational number, in solving different challenges in life	a) Explain the concept of integers, rational and irrational numbers	<b>i) Exercise:</b> Perform various exercises to identify rational and irrational numbers <b>ii) Self-evaluation:</b> Make self-evaluation on how to represent rational and irrational numbers on a number line	<b>i) Group Discussion</b> Lead learners to discuss rational and irrational numbers <b>ii) Think pair share:</b> Guide learners to share experiences on how to represent rational and irrational numbers on a number line	Rational and irrational numbers are correctly identified  Rational and irrational numbers on a number line are correctly presented	Number cards, Number charts, Orange, Razor blade, Graph papers, IAE mathematics module	10 Hours	4 Hours
			c) Solve inequalities and absolute values	<b>) Internet Search:</b> A learner should use internet to search examples that show how to solve inequalities and absolute values	<b>i) Group discussion:</b> Organize learners in manageable groups to solve inequalities and absolute values	Inequalities and absolute values are correctly solved			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
2. APPLYING PERCENTAGE, FRACTIONS, DECIMALS AND SETS TO SOLVE REAL LIFE PROBLEMS	2.1 Demonstrate ability to compute decimals, fractions, percentage, ratios, proportions, rates, variations and sets	2.1.1 Apply fraction, decimals and percentages in life	a) Perform basic operations with fraction, decimals and percentages	<b>i) Internet Search:</b> A learner should use internet to search examples that show how to perform basic operations with fraction, decimals and percentages	<b>i) Problem solving:</b> Provide learners with examples of fractions, decimals and percentages. Guide them to perform basic operations with fraction, decimals and percentages	Basic operations with fraction decimals and percentages are properly performed	Number cards, Number charts, Orange, Razor blade, Graph papers, IAE mathematics module		
		2.2.2 Use ratios, proportions, rates and variations in daily life	a) Use quantities in daily life ( <i>Compare different quantities of the same kind, ratios in simple form, division of given quantities in given proportions</i> )	<b>i) Internet Search:</b> A learner should search materials related to different quantities of the same kind <b>ii) Homework:</b> A learner should do questions of ratios of numbers in simple form <b>iii) Library Search:</b> A	<b>i) Group Discussion:</b> In small groups, guide learners to discuss different quantities of the same kind <b>ii) Problem Solving:</b> In manageable groups, guide learners to write ratios in simple form <b>iii) Group</b>	Quantities are correctly used	Tactile charts, Braille, Labelled container of different lengths/ areas	10 Hours	3 Hours

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				learner should search materials on how to divide quantities in proportions	<b>Discussion:</b> In manageable group, guide learners to divide quantities in proportions				
			b) Convert repeating/ recurring decimals into fractions and vice versa	<b>Library:</b> A learner to make a library search on the conversion of repeating/ recurring decimals into fractions and vice versa	<b>Problem solving:</b> Provide learners with examples of decimals and guide them to identify repeating/recurring decimals, and convert repeating/ recurring decimals into fractions and vice versa then allow them to share with the rest of the class through presentations	Repeating/ recurring decimals into fractions and vice versa are correctly converted			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				<p><b>i) Exploration:</b> A learner should explore real-life problems involving rational numbers. Practise to locate points on the number line</p> <p><b>ii) Self-evaluation:</b> A learner should make self - evaluation on how to represent rational numbers on a number line</p>	<p><b>i) Group discussion:</b> Organize learners in manageable groups to draw number lines and guide them to discuss steps of representing rational numbers on a number line</p>	Rational numbers on a number line are properly represented	Number cards, Number charts, Orange, Razor blade, Graph papers, IAE mathematics module	10 Hours	4 Hours
			c) Describe the concepts of rates and variations	<p><b>i) Self-evaluation:</b> A learner should make self - evaluation on the concepts of rates and variations</p>	<p><b>i) Exploration:</b> Organise learners in manageable groups and guide them to explore real-life problems related to the concepts of rates and variations</p>	Concepts of rates and variations are well described	Number cards, Number charts, Orange, Razor blade, Graph papers, IAE mathematics module	10 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			d) Solve problems on rates and variations	<b>i) Assignment:</b> A learner should perform variety of tasks to solve problems on rates and variations.	<b>i) Group discussion:</b> In manageable groups, guide learner to discuss problems involving rates and variations	Problems on rates and variations are correctly solved	Mathematical sets, Calculators, Money, and Manila papers		
		2.2.3 Use sets in daily life	a) Describe and identify sets ( <i>types of sets, subsets, operation with sets, and Venn diagrams of two sets</i> )	<b>i) Library Search:</b> Search materials on how to describe and identify sets <b>ii) Assignment:</b> Perform variety of tasks to determine the number of subsets of a given set	<b>i) Group Discussion:</b> In small group guide learners to describe and identify sets <b>ii) Think pair and share:</b> Guide learners to list the number of subsets contained in given sets	Sets are properly described	Number cards, Number charts, Orange, Razor blade, Graph papers, IAE mathematics module		

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				<b>i) Field trip:</b> A learner should visit in any working organization to identify grouping of staffs/things and compare it to types of sets	<b>i) Problem Solving:</b> Organise learners in manageable groups to examine the different types of sets	Different types of sets are examined			
			b) Perform operations with sets ( <i>union, intersection, and complement of a set</i> )	<b>i) Library Search:</b> A learner should search materials on how to perform operations with sets	<b>i) Group Discussion:</b> Organize learners in manageable groups to perform operations with sets.	Operations with sets are correctly performed			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			c) Represent two sets in a Venn diagram	<b>i) Library Search:</b> A learner should search materials on how to represent two sets in a Venn diagram	<b>Visual representation:</b> Guide learners to use charts and tables to represent two sets in a Venn diagram	Two sets in a Venn diagram are well represented			
<b>3. ESTIMATING APPROXIMATIONS</b>	3.1 Demonstrate the ability to apply the knowledge of approximations in real life situation.	3.1.1 Use approximations in various contexts	a) Perform proper approximations in either higher or lower approximations	<b>i) Assignment</b> A learner to perform proper approximations in either higher or lower approximations	<b>i) Guest speaker</b> Guide learners to participate in discussion with colleagues to perform proper approximations in either higher or lower approximations	Proper approximations in either higher or lower are correctly performed	Number charts Manila papers Marker pens	10 Hours	2 Hours
			b) Round off whole numbers and decimals	<b>i) Internet Search</b> A learner should search materials related to	<b>i) Jigsaw:</b> Organise learners in manageable groups to	Whole numbers and decimals to are clearly rounded off.			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				rounding off whole numbers and decimals	discover how to round off whole numbers and decimals.				
			c) Write a number to a given number of significant figures	<b>i) Library Search</b> A learner should visit library to search materials on rounding off decimals	<b>i) Group discussion:</b> Organize learners in manageable groups, guide them to discuss number to a given number of significant figures	Number to a given number of significant figures are correctly written.			
			d) Make approximation in calculations	<b>Assignment:</b> A learner should do different questions to perform activities on significant figures	<b>Visual representations:</b> Provide learners with visual aids such as diagrams, charts, and graphs to illustrate approximation in calculations	Approximation in calculations is correctly made			
4.	4.1	4.1.1 Solve	a) Formulate	<b>i) Self-</b>	<b>i) Collaborative</b>	Algebraic	•Real	20 Hours	4 Hours

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
COMPUTING ALGEBRAIC EXPRESSIONS AND SOLVING ALGEBRAIC EQUATIONS AND INEQUALITIES	Demonstrate ability to Simplify algebraic expressions, solve algebraic equations and draw graphs.	daily life problems using algebra	algebraic expressions	<b>evaluation</b> A learner should make self - evaluation on algebraic expressions	<b>learning:</b> In small group guide learners to formulate algebraic expressions	expressions are correctly formulated	objects • Coloured chalks • Manila papers • Marker pens		
			b) Perform basic operations with algebraic expressions (+, -, x, ÷)	<b>i) Library Search</b> A learner should use library in searching materials related to algebraic operations	<b>i) Problem solving:</b> In manageable groups, guide the learners to perform basic operations with algebraic expressions (+, -, x, ÷)	Basic operations with algebraic expressions (+, -, x, ÷) are well performed.			
			c) Solve problems with binary notations (stars)	<b>i) Assignment</b> A learner should solve various questions of binary notations (stars)	<b>i) Problem solving:</b> In manageable groups, guide the learners to solve problems with binary notations (stars)	Real life examples of Problems with binary notations are well solved.			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		4.1.2 Demonstrate ability to solve linear and simultaneous equations	a) Formulate linear equations form a given word problem	<b>i) Self-evaluation</b> A learner should search materials that enable to formulate linear equations form a given word problem	<b>i) Collaborative learning:</b> In small groups, guide learners to formulate linear equations form a given word problem	Linear equations form a given word problem are well formulated	Beam balance, Manila paper, Coloured chalk, Marker pen, Chart Printed/chart Work sheet	20 Hours	4 Hours
			b) Solve linear inequalities with one unknown	<b>i) Internet Search</b> Search materials that show how to solve linear equations in one unknown	<b>i) Exploration:</b> In small groups guide learners to solve linear inequalities with one unknown	Linear inequalities with one unknown are correctly solved			
			c) Solve linear simultaneous equations	<b>i) Internet Search:</b> A learner should search materials related to solving linear simultaneous equations	<b>i) Collaborative learning:</b> In manageable group guide learners to solve linear simultaneous equations	Linear simultaneous equations are well solved			
		4.1.3 Use coordinate geometry skills in	a) Draw coordinate axes and locate points	<b>i) Self-evaluation:</b> A learner should search materials	<b>i) Jigsaw:</b> Guide learners to draw coordinate axes	Coordinate of points are correctly located on coordinate	Graph paper Rural Manila paper	20 Hours	4 Hours

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		daily life	and read coordinates of located points	that enable how to draw coordinate axes and locate points and read coordinates of located points	and locate points and read coordinates of located points	axes	Marker pen Garboard Rubber band Graph board		
			b) Determine the gradient (slope) of a line drawn through given points	a) <b>Library Search:</b> A learner should use library in searching materials to assist in determining the gradient (slope) of a line drawn through given points.	<b>i) Think pair and share:</b> Guide learners to determine the gradient (slope) of a line drawn through given points	Gradient (slope) of a line drawn through given points are well determined			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		4.1.4 Demonstrate the mastery on finding gradient and equation of a straight line	a) Formulate equation of line in the form of $y = mx+c$	<b>i) Assignment:</b> A learner should do various activities to formulate equation of line in the form of $y = mx+c$	<b>i) Problem solving:</b> In manageable groups, guide learners to formulate equation of line in the form of $y = mx+c$	Equation of line in the form: $y = mx+c$ is correctly formulated	Graph paper, Ruler, Manila paper, Marker pen, Garboard, Rubber band, Graph board,	20 Hours	8 Hours
			b) Find slope and y– intercept from a given equation	<b>i) Library Search:</b> A learner should use library in searching materials that will aid to find slope and y– intercept form a given equation	<b>i) Problem solving:</b> In manageable groups, guide the learners to determine the slope and y– intercept of a given line.	Slope and y– intercept from a given equation is well calculated.			
			c) Find x and y intercepts of a given equation	<b>i) Self-evaluation:</b> A learner should Make self-evaluation on how to find x and y intercepts	<b>i) Exploration:</b> Guide the learners to find x and y intercepts of a given equation	x and y intercepts of a given equation are well found Table of values for a given equation is			

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				of a given equation		accurately drawn.			
			d) Draw table of values then plot the graphs of a given equation	<b>i) Library Search</b> A learner should use library in searching materials that will help to draw table of values for a given equation then plot the graphs of a given equation	<b>i) Visual representation</b> Guide learners to use visual aids to draw table of values for a given equation then plot the graphs of a given equation	Graphs of a given equations are accurately plotted.			
<b>5. CALCULATING CONGRUENCE AND SIMILARITY</b>	5.1 <b>Demonstrate mastery of basic concept in</b> Geometry and algebra.	5.1.1 use geometry, congruence, similarity, in real life	a) Describe the concepts of geometry ( <i>similarities and congruence</i> )	<b>Self-evaluation:</b> A learner to make a self-evaluation on concepts of similarities and congruences	<b>Group discussion:</b> In manageable groups, guide learners to discuss the concepts of similarities and congruences using physical examples such as pattern blocks, tangrams or	concepts similarities and congruence are well described	blocks, tangrams or geoboards	15 Hours	3Hours

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				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
					geoboards				
			b) Examine properties of similar triangles	<b>i) Exploration:</b> A learner to discover the properties of similar triangles	<b>i) Visual representation:</b> Guide learners to use visual aids to examine the properties of similar triangles.	Properties of similar triangles are properly examined			
			c) Explain postulates, proofs, and theorems of congruent triangles	<b>i) Assignment</b> A learner should perform the exercise on how to explain postulates, proofs, and theorems of congruent triangles	<b>i) Group discussion:</b> Guide learners in small group to discuss the postulates, proofs, and theorems of congruent triangles	Postulates, proofs, and theorems of congruent are clearly explained			
<b>6. APPLYING EXPONENTS, RADICALS, TRANSPOSITION OF FORMULA, LOGARITHMS AND</b>	<b>6.1</b> Demonstrate ability to use Relationship among exponents, radicals, logarithms and solve quadratic	6.1.1 Demonstrate the mastery of exponents and radicals in	a) Explore the basic concepts of algebra ( <i>quadratic expressions and equations, radicals, exponents, and logarithms</i> )	<b>i) Library Search:</b> A learner should use library in searching materials that shows the concept of algebra	<b>i) Problem solving:</b> In manageable groups, guide learners to apply the basic concepts of algebra <b>ii) Problems solving:</b> In	The basic concepts of algebra are correctly explored	mathematical tables manila papers Marker pens Rulers	6 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
QUADRATIC EQUATIONS IN REAL LIFE SITUATIONS	equations using different formulae	different context			manageable groups, guide learners to apply binary operations to simplify quadratic expressions				
			b) Solve quadratic equations by using different methods (factorization, Completing the square, and quadratic formula).	<b>i) Assignment:</b> A learner should practise different methods of solving quadratic equation	<b>i) Group discussion:</b> Guide learners in their groups to solve quadratic equations by using factorisation, completing the square, and quadratic formula.	Quadratic equations are solved correctly	mathematical tables, manila papers. Marker pens and Rulers	4 Hours	2 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			c) Identify and use laws of exponents involving positive, negative, and zero exponent (multiplication law, division law, power law, and zero index	<b>i) Library Search:</b> A learner should search for materials that help to identify and use laws of exponents involving positive, negative, and zero exponents	<b>i) Problem solving:</b> Guide learners to and use laws of exponents involving positive, negative, and zero exponents to simplify and solve exponential equations	Laws of exponents are clearly identified and used correctly	Exponents, puzzles, Exponent ruler, posters, and Exponent games	12 Hours	4 Hours
		6.1.2 Demonstrate ability to apply Logarithms in daily life	a) Write numbers in standard form	<b>i)Self-evaluation:</b> A learner should make a self-evaluation on writing a number in standard form	<b>i) Group discussion:</b> Guide learners to discuss the way of writing the numbers in standard forms	Numbers are correctly written in standard form	Mathematical tables, Charts, Graph papers, Calculator, Mathematical table, Number, charts	4 Hours	2 Hours
			b) Use laws of	<b>i) Library</b>	<b>i) Interactive</b>	Laws of			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			logarithms to solve problems	<b>Search</b> Search different materials that enable to draw bar charts and histograms	<b>discussion:</b> Guide learners to discuss the laws of logarithms and use it to solve the logarithms problems	logarithms are correctly used to solve the problems			
			c) Perform operations on radicals and rationalize the denominators	<b>i) Assignment:</b> A learner should perform different operations based on the operations on radicals and rationalize the denominators.	<b>i) Think pair and share:</b> Guide learners to discuss the operations on radicals and rationalize the denominators	Operations on radicals and rationalize the denominators are correctly performed			
<b>7. EXPLORING THE BASIC CONCEPT OF TRIGONOMETRY.</b>	7.1 Demonstrate the ability to use basic coordinate geometry, trigonometry	7.1.1 Demonstrate the ability to apply trigonometric ratios, angles of elevation and depression	a) Explore the basic concepts of trigonometry (trigonometric ratios, angles of elevation and depression	<b>i) Internet Search:</b> Browse materials in internet, search the basic concepts of trigonometry	<b>i) Brainstorming:</b> Guide learners to illustrate the basic concepts of trigonometry	The basic concepts of trigonometry are clearly explored	Mathematical sets Geoboard Right angle triangle Mathematical graph papers Mathematical animation.	15 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	SUGGESTED FACILITATION AND LEARNING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		n in a real-life situation							
			b) Determine trigonometric ratios of angles and special angles	<b>i) Homework:</b> A learner to learn on how to determine trigonometric ratios of angles and special angles	<b>i) Group Discussion:</b> <b>Guide</b> learners to discuss with colleagues on trigonometric ratios of angles and special angles	Trigonometric ratios of angles and special angles are clearly determined			
			c) Calculate angles of elevation and depression	<b>Skimming:</b> A learner should browse on how to calculate angles of elevation and depression.	<b>Exploration:</b> Organise learners in manageable groups to calculate angles of elevation and depression.	Angles of elevation and depression are calculated correctly			

## **BASIC MATHEMATICS SYLLABUS STAGE II**

### **COMPETENCES FOR BASIC MATHEMATICS STAGE II**

Upon completion stage II modules of Basic Mathematics, a learner should be able to:

1. Demonstrate mastery of basic concepts in geometry and algebra;
2. Apply the knowledge of sequence and series in real life
3. Demonstrate mastery of the use of circle theorems in real life
4. Demonstrate mastery of basic concepts in probability and statistics
5. Demonstrate mastery of basic concepts in coordinate geometry, trigonometry
6. Demonstrate mastery of basic concepts in geometry and algebra

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
<b>1. APPLYING RELATIONS, FUNCTIONS AND LINEAR PROGRAMMING IN REAL LIFE SITUATIONS</b>	1.1 Demonstrate mastery of basic concepts in geometry and algebra;	1.1.1 Use geometry, approximations, relations and functions in various contexts	a) Describe the concepts of relations and functions	<b>i) Self-study</b> A learner should make self-evaluation conducting different sources on the concepts of relations and functions.	<b>i) Group discussion:</b> Organise learners in manageable groups to discuss the concepts of relations, functions, types of relations and functions, and link between relations and functions	Concepts of relations and functions are correctly described	Coloured chalks, Red objects, Manila sheet, Maker pens, Graph papers, Rubber bands, Graph boards, Recommended books from TIE and Modules from IAE	25 Hours	10 Hours
			b) Find the domain and range of relations and functions	<b>i) Library search:</b> A learner should visit library to search for different materials on domain and range of relations and functions.	<b>i) Exploration:</b> Guide learners in manageable groups to explore the domain and range of relations and functions.	Domain and range of relations and functions are clearly found  Inverses of relations and functions are correctly found			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			c) Find the inverses of relations and functions	<b>i) Internet search:</b> A learner should browse on how inverse of relations, and functions are calculated	<b>i) Problem solving:</b> Assess the accuracy of answers provided by learners when solving inverse of relations, and functions.	Graphs of relations and functions are accurately drawn			
			d) Draw graphs of relations and functions	<b>i) Libral Search:</b> A learner should visit library to search to materials that will enable to draw graphs of relations and functions	<b>i) Visual representation:</b> Guide learners in manageable groups to use visual aids to draw graphs of relations and functions  <b>ii) Hands-on Practice:</b> Guide learners to use technology such as graphing calculators, and software such as MATLAB to draw graphs of relations and functions				
		1.1.2	a) Conceptualize	<b>i) Field</b>	<b>i) Discussion:</b>	Common	Scientific	20	10

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		Use algebra and matrices in problem solving	common terminologies used in linear programming ( <i>feasible region, optimal value, corner points, objective function, linear constraints, and decision variables</i> )	<b>study</b> A learner should visit different business centres and see how linear programming is used for maximization of products and services	Guide learners to discuss with fellow the common terminologies used in linear programming	terminologies used in linear programming are clearly conceptualized	Calculators, Electronic devices, graph papers, Relevant related mathematics texts, Recommended books from TIE and Modules from IAE	Hours	Hours
			b) Form and solve simultaneous equations from word problems	<b>ii) Library Search:</b> A learner should visit library to search for materials on how to form and solve simultaneous equations from word problems	<b>ii) Demonstration:</b> A facilitator should demonstrate to the learner on how to form and solve simultaneous equations from word problems	Simultaneous equations from word problems are clearly conceptualized			
			c) Form linear inequalities in two unknowns	<b>i) Assignment</b> A learner	<b>i) Questions and answers:</b> Guide learners in		-		

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			and find solution set of simultaneous linear inequalities graphically	should perform a variety of activities on how to form linear inequalities in two unknowns and find solution set of simultaneous linear inequalities graphically.	manageable groups to form linear inequalities in two unknowns and find solution set of simultaneous linear inequalities graphically				
			d) Form an objective function and find the maximum and minimum values using objective function.	<b>i) Self-intensive reading:</b> A learner should intensively read materials that enable to form an objective function and find the maximum and	<b>i) Problem solving:</b> In manageable groups, provide learners with questions to form an objective function and find the maximum and minimum values using objective function.				

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				minimum values using objective function.					
<b>2. APPLYING SEQUENCE AND SERIES IN REAL LIFE SITUATIONS</b>	2.1 Apply the knowledge of sequence, series and circles in real life;	2.1.1 Use sequence and series in real life	a) Conceptualize sequences and series ( <i>Arithmetic progression AP, Geometric progression GP</i> )	<b>i) Library Search:</b> A learner should visit library to search to materials that will enable to conceptualize of sequences and series	<b>i) Exploration:</b> Guide learners to conceptualize of sequences and series <b>ii) Group Discussion:</b> Guide learners to discuss the concepts Arithmetic Progression (AP) and Geometric Progression (GP)	Sequences and series are well conceptualized	Pattern puzzles, pattern blocks, visual aids, sequence and series games and applications, calculators,	20 Hours	6 Hours
			b) Find the general term for AP and GP and use them to derive formulae for the sums of APs and GPs	<b>Internet Browse:</b> A learner should search materials related to general term for AP and GP and use them to derive formulae for	<b>i) Exploration:</b> Lead learners in small groups to examine and derive the $n^{\text{th}}$ terms of AP and GP <b>ii) Group discussion:</b> In manageable groups, guide learners to determine the $n^{\text{th}}$ terms of APs and	The general term for AP and GP is correctly found  The formulae for the sums of APs and GPs are precisely derived			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				the sums of APs and GPs.	GPs.				
			c) Calculate arithmetic mean, geometric mean, and compound interest	<b>i) Observation</b> A learner should observe different sources that demonstrate how to calculate arithmetic mean, geometric mean, and compound interest	<b>i) Questions and answers:</b> Guide learners in manageable groups to calculate arithmetic mean, geometric mean, and compound interest	Arithmetic mean, geometric mean, and compound interest are properly calculated			
<b>DEMONSTRATING MASTERY OF THE USE OF CIRCLE THEOREMS IN REAL LIFE</b>	3. Demonstrate mastery of the use of circle theorems in real life	3.1.1 Use basic skills of circles in daily life	a) Conceptualize common terms used in circles ( <i>circle, centre, radius, chord, secant, tangent, sector, inscribed angle, arc, central angle</i> )	<b>i) Scenario:</b> A learner should analyse various scenarios that depict basic concepts used in	<b>i) Problem solving:</b> In manageable groups, provide learners with questions to conceptualize common	Common terms used in circles are correctly conceptualized	Charts of circle animations, simulations, mathematical sets, visual aids, Mathematical software such as GeoGebra	15 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				circles.	terms used in circles				
			b) Prove basic circle properties, theorems and postulates (angle properties, theorems, tangents, chords and radians)	<b>i) Library Search</b> A learner should search materials to prove basic circle properties, theorems and postulates	<b>i) Visual representati on:</b> Guide learners to use visual aids to prove basic circle properties, theorems and postulates	Basic circle properties, theorems and postulates are correctly proved			
			c) Solve problems related to arc, radian, perpendicular bisector of a chord, tangents to the circle	<b>i) Library Search:</b> A learner should visit library to search for materials on how to solve problems related to arc, radian, perpendicular bisector of a chord, tangents to the circle.	<b>i) Group Discussion:</b> Organize small group of learners and guide them to solve problems related to arc, radian, perpendicular bisector of a chord, tangents to the circle	Problems related to arc, radian, perpendicular bisector of a chord, tangents to the circle are thoroughly solved			
<b>3. APPLYING</b>	3.1 Demonstrat	3.1.1 Use statistics to	a) Conceptualize the basic terms	<b>i) Library search:</b> A	<b>Group discussion:</b>	Basic terms used in		20 Hours	4 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
STATISTICS AND PROBABILITY IN DAILY LIFE	e mastery of basic concepts in probability and statistics	solve real life problems	used in statistics ( <i>frequency distribution, measures of central tendency histogram, frequency polygon, and cumulative frequency curve 'ogive'</i> )	learner should visit library to search materials based on frequency distribution, measures of central tendency histogram, frequency polygon, and cumulative frequency curve 'ogive')	Guide learners in manageable groups to discuss and determine the frequency distribution, measures of central tendency, histogram, frequency polygon and cumulative frequency curve 'ogive'	statistics are correctly			
			b) Draw histogram, frequency polygon, and cumulative frequency curve 'ogive'	<b>Use of technology:</b> A learner should use technology such as graphing	<b>Group discussion:</b> Guide learners in groups to draw histogram, frequency polygon, and cumulative frequency	Histogram, frequency polygon, and cumulative frequency curve 'ogive' are clearly drawn			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				calculators, and software such as Excel and MATLAB to draw histogram, frequency polygon, and cumulative frequency curve 'ogive'	curve 'ogive'				
			c) Interpret histogram, frequency polygon, and cumulative frequency curve 'ogive'	<b>Using technology:</b> A learner should use technology like smart phones, iPad to see how histogram, frequency polygon, and cumulative frequency curve 'ogive' can be	<b>Visual representation:</b> Guide learners to use histogram, frequency polygon, and cumulative frequency curve 'ogive' to get different information	Histogram, frequency polygon, and cumulative frequency curve 'ogive' are clearly interpreted			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				interpreted					
		3.1.2 Use probability in problem solving	a) Apply the basic terms of probability of two events (probability of an event, mutually exclusive events, dependent events, combined events using tree diagrams, tables and formulae	<b>i) Self learning:</b> A learner should consult different materials on the application of probability of two events (probability of an event, mutually exclusive events, dependent events, combined events using tree diagrams, tables and formulae	<b>i) Visual representation:</b> Guide learners to use interactive tools to demonstrate concept of probability of an event	The basic terms of probabilities of two events are clearly applied	Circular Objects, Rope, Thread, Ruler, Coin, Die, Coloured objects, Cloth, Cards, Games, Playing cards -	15 Hours	4 Hours
			b) Calculate probability of an event and combined events	<b>Library search:</b> A learner should visit	<b>ii) Group discussion:</b> Guide learners in manageable groups				

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				library and search for materials that show examples to calculate probability of an event and combined events	to discuss and determine probability of an event, dependent event, combined events using tree diagram, tables and formulae	correctly calculated			
<b>4. DEMONSTRATING THE USE OF CO-ORDINATE GEOMETRY AND TRIGONOMETRY</b>	4.1 Demonstrate mastery of basic concepts in coordinate geometry, trigonometry	4.1.1 Use the coordinate geometry and trigonometry skills in daily life	a) Explore the basic tenets of coordinate geometry (midpoint of a line segment, distance between two points on a line, parallel, and perpendicular lines)	<b>i) Skimming:</b> A learner should browse on the basic tenets of coordinate geometry <b>ii) Library Search:</b> A learner should visit library to search to materials that will enable to determine the midpoint of a line	<b>i) Demonstration:</b> Guide learners to demonstrate the concepts of midpoint of a line segment, distance between two points on a line, parallel lines, and perpendicular lines using real-life problems <b>ii) Problem solving:</b> Organise learners in manageable groups to use real world examples to find the midpoint of a line segment,	The basic tenets of coordinate geometry are clearly explored	Graph papers, Squared paper, Geo board, Rubber band, Graph board, Mathematical instruments, Mathematic tales, Graph papers, Rubber bands, Geo board.	15 Hours	3 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				segment, distance between two points on a line, parallel, and perpendicular lines)	distance between two points on a line, parallel, and perpendicular lines <b>iii) Visual representation:</b> Guide learners to use graphs, charts, and real objects to explain the concepts of midpoint of a line segment, distance between two points on a line, parallel lines, and perpendicular lines.				
			b) Apply sine and cosine rules to find distances or angles of elevation	<b>i) Scenario:</b> A learner should read and analyse various scenarios that demonstrate the use of sine and cosine rules to find distances or angles of	<b>i) Exploration:</b> Guide learners to explore the application of sine and cosine rules in finding distances or angles of elevation <b>ii) Use of technology:</b> Guide learners to use technology such as graphing calculators, and software such as	Sine and cosine rules are correctly applied to find distances or angles of elevation			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				elevation.	Excel and MATLAB to apply sine and cosine rules to find distances or angles of elevation <b>ii) Problem solving:</b> In manageable groups, provide learners with questions to practice on how to apply the sine and cosine rules to determine the distance or angles of elevation.				
			c) Derive and use compound angles to solve problems	<b>i) Library Search:</b> A learner should search materials which show examples of how to derive and use compound angles	<b>i) Problem solving:</b> In manageable groups, provide learners with questions to practice on how to derive and use compound angles to solve problems	Compound angles correctly derived  Compound angles are correctly used to solve problems			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
					to solve problems.				
<b>5. APPLYING VECTORS, MATRICES AND TRANSFORMATION IN SOLVING REAL LIFE RELATED PROBLEMS</b>	5.1 Demonstrate mastery of basic concepts in geometry and algebra	5.1.1 Demonstrate ability to apply vector in real life	a) Explain meaning of vector and resolve it in its i and j components	<b>Internet Search:</b> A learner should browse materials on the internet to search the meaning of vector and how to resolve it in its i and j components	<b>Visual representation:</b> Guide learners to use interactive tools to demonstrate concept of vector and how to resolve it in its i and j components	Meaning of vector and its components is clearly explained	Graph board, Ruler, Graph papers, Set squares. Coloured chalks	30 Hours	10 Hours
			b) Determine magnitude, unit vector and direction of a vector	<b>i) Skimming:</b> A learner should skim in different sources how to calculate arithmetic mean, geometric mean, and compound interest	<b>i) Group Discussion:</b> Guide learners in manageable groups to discuss and determine magnitude, unit vector and direction of a vector	Magnitude, unit vector and direction of a vector is well determined			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			c) Distinguish between vector quantity and scalar quantity	<b>Library Search:</b> A learner should visit library to search for materials on how to distinguish between vector quantity and scalar quantity	<b>Problem solving:</b> In manageable groups, guide learners with questions to practice on how to distinguish between vector quantity and scalar quantity	Vector quantity and scalar quantity are correctly distinguished.			
			d) Perform operations with vectors (sum, difference, product and Multiply vector by scalar)	<b>Scanning:</b> A learner should intensively scan from different materials how to perform operations with vectors	<b>Questions and answers:</b> Organise learners in manageable groups to perform operations with vectors	Operations with vectors are correctly perform			
		5.1.2 Use matrices in problem solving	a) Explore the basic concepts of matrices (2×2) matrices: operations, determinant,	<b>Internet Search:</b> A learner should browse materials on	<b>Visual representation:</b> Guide learners to use graphs, charts, and tables to explain the concept	Basic concepts of matrices are clearly explored	Visual aids, Colored, locks, matrix calculators, charts of	20 Hours	5 Hours

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
			inverse, and transformations)	the basic concepts of matrices	of matrices		real-life scenarios, graphing calculators		
			b) Apply matrices to solve simultaneous equations of two unknowns (Matrix inversion method and Cramer's rule).	<b>i) Skimming:</b> A learner should browse in different sources how to apply matrices to solve simultaneous equations of two unknowns	<b>Questions and answers:</b> Organise learners in manageable groups to determine the solution of simultaneous equations of two unknowns using matrix inversion method and Cramer's rule <b>Use of technology:</b> Guide learners to use technology such as graphing calculators, and software such as Excel, Microsoft Mathematics, and MATLAB to determine the solutions of simultaneous equations with two unknowns using matrix inversion method and	Simultaneous equations of two unknowns Using matrices are clearly solved			

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
		5.1.3 Use transformation in solving problems in different contexts	a) Apply matrix to reflect a point $p(x, y)$ in the $x$ and $y$ -axis	<b>i) Self-evaluation</b> A learner should apply matrix to reflect a point $p(x, y)$ in the $x$ and $y$ -axis	<b>i) Exploration:</b> Organise learners in manageable groups to explore the concepts of reflection, rotation and enlargement of a point.	Point $P(x, y)$ in the $x$ and $y$ -axis by using matrix is correctly reflected			
			b) Use matrix operator to rotate any point $P(x, y)$ through a given angle about the origin	<b>Library Search</b> A learner should use library in searching materials related to rotate any point $P(x, y)$ through a given angle about the origin	<b>Think-ink-pair-share:</b> In manageable groups, guide learners to discuss how to use matrix in reflection, rotation and enlargement	Point $P(x, y)$ through a given angle about the origin are correctly rotated  Figures using matrix are properly enlarged	-		
			c) Enlarging figures using matrix	<b>Field visit</b> Visit any vocational centre to see how					

NAME OF MODULE	MAIN COMPETENCES	SPECIFIC COMPETENCES	LEARNING ACTIVITIES	LEARNING/FACILITATING STRATEGIES		ASSESSMENT CRITERIA	FACILITATION/LEARNING RESOURCES	TIME	
				SELF LEARNING	FACE TO FACE SESSION			SELF LEARNING	FACE TO FACE
				enlarging figures using matrix					

## BIBLIOGRAPHY

Institute of Adult Education. (2022). *Mathematics syllabus stage I & II for alternative secondary education pathway*.

Tanzania Institute of Education. (2023). *Basic mathematics syllabus for ordinary secondary education form I–IV*.