Course Title: Foundation to the Basic Concepts of Mathematics

Course Prerequisites:
This course is designed for candidates meeting the following prerequisites.

Educational:
- The minimum educational qualification for the course is an Intermediate degree (F. A /F. Sc.)
- A basic level of written and oral proficiency in English Language is compulsory
- A basic level of IT skills are preferred

Professional:
- In-service teachers of primary level Mathematics or pre-service candidates intending to take primary level teaching of Mathematics as a profession

Course Duration:
The total duration of this part time inset course covers a span of 21 days; delivered as 5 contact hours per day.

Module	Days	Hours	Specification
Module-1 *Number Sense & Operations*	5	25	▪ Roman Numbers ▪ Place Value ▪ Comparing Numbers ▪ Factors & Multiples ▪ Number Operations ▪ Word Problems Involving Four Operations ▪ Ratio & Proportion
Module-2 *Common Fractions, Decimals& Percentage*	6	30	▪ Common Fractions ▪ Word Problems ▪ Decimals & Percentages ▪ Word Problems
Module-3 *Basic Geometry*	3	15	▪ Basic Shapes ▪ Calculating Perimeter & Area of Squares & Rectangles ▪ Angles & Types of Angles ▪ Triangles & Types of Triangles ▪ Calculating Perimeter & Areas of

			Triangles
Module-4 *Measurement*	5	25	▪ Standard Units of Length, Mass & Volume ▪ Addition & Subtraction of Standard Units of Length, Mass & Capacity ▪ Conversions of Units of Length, Mass & Volume ▪ Real Word Problems Involving Conversions
Module-5 *Information Handling*	2	10	▪ Read & Interpret Picture, Bar & Line Graphs ▪ Find the Measure of Central Tendency (Mean, Median & Mode Range)
Total	**21**	**105**	

The course consists of a total of 105 hours of instruction and an ongoing teaching practicum embedded between face to face sessions throughout the duration of the course.

Contact Hours for the Content Input:

105 hours of direct engagement in formal face to face training.

The Course Content:

The following are the highlights that provide a quick overview of the mathematical knowledge and skills that teachers are expected to acquire during the training program. These expectations provide information about the ways in which teachers demonstrate their learning, how deeply they explore concepts and at what level of complexity they perform the procedures, and the mathematical processes learned and applied throughout the session.

Module 1: Number Sense /Number Operations

- Identify place values of number up to hundred, thousand, million & one billion
- Compare numbers up to one thousand, one million & one billion
- Analyze patterns & relationships with respect to number, color and shape

- Determine the rule for repeating & extending patterns
- Identify even and odd numbers up to 99
- Identify prime & composite numbers up to 100
- Differentiate between factors & multiples
- Find the LCM by common multiples & prime factorization method
- Find the HCF of 2-digit numbers using Venn diagram & prime factorization
- Add numbers (with & without carrying) from 4-digits up to one billion and increasing complexity
- Subtract numbers (with & without borrowing) from 4-digit numbers up to one billion and increasing complexity
- Multiply numbers up to 6-digits with 2 and 3 digit numbers
- Divide numbers up to 6-digits with 2 and 3-digit numbers
- Identify & use divisibility rules for 2, 3, 5, and 10 on numbers up to 5 digits
- Solve real life problems involving addition, subtraction, multiplication & division

Module 2: Common & Decimal Fractions

- Define a fraction & order fractions, both in ascending and descending order, and identify the Proper, improper, and mixed fractions
- Convert improper fractions to mixed fractions and mixed fractions to improper fractions
- Add and subtract fractions with unlike denominators
- Demonstrate commutative and associative property of addition with fractions with the same denominators
- Multiply a fraction by a whole number
- Divide a fraction by a whole number
- Divide a whole number by a fraction
- Multiply and divide two or more fractions (proper, improper, and mixed)
- Use all operations to solve real life problems with fractions
- Identify a decimal as an alternate way to write a fraction
- Define a decimal as a fraction with a denominator of 10 or a power of 10

- Recognize and identify the place value of a digit in decimals

- Convert a fraction to a decimal with or without 10 or a power of 10

- Convert decimals of up to three decimal places to fractions

- Add and subtract decimals of up to two decimal places

- Divide a decimal by a 1 digit number with the quotient being a decimal up to two decimal places

- Solve real life problems involving decimals

- Recognize percentage as a special kind of fraction

- Solve real life problems involving percentages

Module 3: Geometry

- Define the term Geometry

- Recognize point, line segment and a ray

- Recognize horizontal & vertical lines

- Recognize parallel & non parallel lines

- Draw the line of a given length in centimeters & millimeters using a straight edger/ruler

- Draw a vertical line on a horizontal line using set squares

- Draw a line which passes through a given point & is parallel to a given line using set squares

- Draw parallel & non parallel lines from a given set of lines

- Draw a curved line & measure its length using thread/divider and ruler

- Recognize an angle through non parallel lines & also draw an angle ABC with vertex B & arms AB & BC to recognize the notation for an angle ABC

- Recognize the unit for measuring angles as one degree which is defined as 1/360 of a complete rotation

- Measure & draw angle using a protractor

- Draw acute, obtuse, right and reflex angles

- Draw an angle (using a protractor) which is equal in measure of a given angle, twice in a measure of a given angle and equal in measure of the sum of two given angles

- Describe adjacent, complementary & supplementary angles

- Identify two and three dimensional shapes

- Analyze characteristics and properties of geometrical shapes (2D and 3D shapes)

- Recognize an angle through non parallel lines & also draw an angle ABC with vertex B & arms AB & BC to recognize the notation for an angle ABC
- Recognize the unit for measuring angles as one degree which is defined as 1/360 of a complete rotation
- Measure & draw angles using a protractor
- Describe types of angles, i.e. acute, obtuse, right, reflex and straight
- Differentiate between perimeter & area of a region
- Identify the units of perimeter & area
- Write the formulas for the perimeter of a square & rectangle
- Apply formulas to find the perimeter & area of a square, rectangle & triangle
- Solve real life problems for perimeters & areas

Module 4: Measurement

- Read & write standard units of length (kilometer, meter & centimeters) using abbreviations
- Read & write standard units of mass/weight (kilogram and gram) using abbreviations
- Read & write standard units of capacity/volume (liter and milliliter) using abbreviations
- Use appropriate units to measure the length, mass/weight, capacity of different objects
- Convert kilometers to meters, meters to centimeters, centimeters to millimeters, kilograms to grams, liters to milliliters
- Add/subtract measures of length, mass/weight, capacity / volume in the same units with & without carrying the number
- Solve real life problems involving the same units of length, mass/weight, capacity/volume for addition & subtraction with & without carrying the number
- Use am & pm to record time from an analog clock
- Read & write time from analog & digital clocks
- Read time in hours, minutes & seconds
- Convert hours to minutes & minutes to seconds
- Read & write days & date from the calendar
- Convert years to months, months to days & days to weeks
- Add/subtract unit of time in hours

- Add & subtract units of time without carrying /borrowing

- Add & subtract measures of distance

- Solve real life problems on addition & subtraction of units of time in hours

- Solve real life problems involving conversions, addition & subtraction of units of time

- Recognize units of temperature in Fahrenheit & Celsius

- Solve real life problems involving conversions, addition & subtraction of unit of temperature

Module 5: Statistics (Data Representation)

- Read, write and construct pictographs
- Read and interpret simple bar graphs given in horizontal and vertical forms
- Read and interpret line graphs
- Construct simple bar graphs and line graphs
- Define and calculate mean, mode and range

Required Materials & Resources

- Handouts

- White board

- Multimedia

- Math Kit

- PowerPoint presentation

Teaching and Learning Methods

This course employs
- Interactive Learning and Teaching with the set objectives and creative thinking methodologies
- Tutorial discussions
- Presentations
- Innovative methods for solving exercises
- In addition to traditional teaching / learning methods, day to day life examples will be used to inculcate concepts and cement the basics of Mathematics

Course Completion Criteria:

DIL specifies that all candidates need to:

- Attend the whole course with a minimum 80 % attendance per module
- Maintain and submit a portfolio of all course work and related documentation, including all materials related to the teaching assignments.
- Carry out all assignments in accordance with the regulations and submit assignments to the DIL Islamabad Office for the assessments by the date specified.

The assessment criteria specified in this segment are subject to change with the organization's policies

Certification:

Successful candidates will get a certificate of completion.

Cost of the Course:

PKR. 2000/ day per participant, excluding costs of resource materials.