**Outline (Mathematics)**

| Topics | Learning Contents | Activities | Skills/Capacities to be nurtured | No. of Periods |
| --- | --- | --- | --- | --- |
| 1. Objectives of teaching Mathematics | Objectives of teaching Mathematics  Goals of Primary Mathematics Education | Observing Primary Textbooks  Group discussion: make a lists of Points to be improved in mathematics learning of the students | Knowledge Curriculum framework | 2 |
| 1. Curriculum Structure | Strands (Numbers, geometry, measurement and mathematical relations) (+Differences between current and new curriculum) | Observing Primary Textbooks , strands, by discussion and presentation | Knowledge Curriculum framework | 2 |
| Grade wise objectives of teaching mathematics at primary level | Group discussion |  | 2 |
| Grade wise curriculum structure of teaching mathematics at primary level |  |  | 2 |
| 1. How Children learn in Mathematics | Background Theories (Inductive Learning/Deductive Learning/analogical learning | Lecture/Explanation |  | 5 |
| Arithmetic Education Theory | Lecture/Explanation |  | 5 |
| Teaching styles( How to conduct individual work, group work, the whole class teaching,) | Activities for the selected lessons on “how to conduct individual work, group work and the whole class teaching” |  | 5 |
| 1. How to support students learning | Typical problems of the current primary mathematics teaching in Myanmar and how to overcome this situation  (Current status of mathematics teaching in our schools)   * The current problems of teaching mathematics   + - * New teaching strategy which improve students’ mathematical thinking skill | * Case study and find out the problems of current teaching * Make presentation on how to change the teaching strategy to improve students’ mathematical thinking skill |  | 2 |
| Heuristics for problem solving   * What are heuristics? * Learning 5 heuristics which can help primary students to solve mathematical problems/questions | * Teacher gives lecture on what is heuristics. * Understand the 5 heuristics by practicing 5 example questions. * Practice explaining heuristics by using some exercise questions |  | 2 |
| Teaching methodology for numbers: The concept of numbers   * Bridge real objects and numerals by semi-concrete objects * Use semi-concrete objects to express, compare, and add numbers up to 10 and then to 19 | * Explanation how to use semi-concrete objects to understand the concept of numbers. * Practising: Trainees will practice to calculate the questions using semi-concrete objects * How to use semi-concrete objects to express numbers more than 100 * Give instructions on additions and subtractions of 2 digit numbers * How to teach multiplication tables * How to express fractions | * Applying appropriate teaching methods * Mastery of subject matter | 4 |
| Teaching methodology for numbers: Calculation of factions   * The tree map on the topics of fractions(G-2 to G-5) * Addition and subtraction of unlike fractions in Grade 5 * addition and subtraction of fraction * Multiplication and division of fraction | * Studying: Where are fractions located in the tree map? * Addition and subtraction of unlike fractions in Grade 5 * Points to pay much attention in teaching fractions: fraction as a quantity for addition and subtraction * Multiplication of fractions in Grade 5 * Points to pay much attention in teaching fractions: fraction as a proportion for multiplication and division, application to the division of fractions |  | 2 |
| Teaching methodology for geometry   * A tree map on the topics of geometry (G1 - G5): How do students develop their ideas about “geometry” throughout primary education? * The lessons on drawing quadrilaterals in Grades 3 and 4 * The lessons on “the properties of quadrilaterals” in Grades 3 and 4 * -Finding properties by folding and cutting these quadrilaterals (rectangle, square, parallelogram, rhombus, trapezium) * -Finding the relationship between these quadrilaterals * Points to pay much attention in teaching geometry | * Studying on a tree map on the topics of geometry: How do students develop their ideas about “geometry” throughout primary education? * Activities for the lessons on drawing quadrilaterals in Grades 3 and 4 * Draw quadrilaterals (rectangle, square, parallelogram, and rhombus) on a paper under several conditions about length and angles. * Activities for the lessons on “the properties of quadrilaterals” in Grades 3 and 4 * Find properties by folding and cutting these quadrilaterals (rectangle, square, parallelogram, rhombus, trapezium) * Find the relationship between these quadrilaterals | * Applying appropriate teaching methods * Mastery of subject matter * Responding to students’ learning styles and needs | 2 |
| Teaching methodology for measurement   * A tree map on the topics of measurement (G1-G5): How do students develop their ideas about “measurement” throughout primary education? * The lessons on “length” in Grade 2 (m, cm, mm) * The lessons on weight and volume | * Studying on a tree map on the topics of measurement (G1-G5): How do students develop their ideas about “measurement” throughout primary education? * Activities for the lessons on “length” in Grade 2 (m, cm, mm) (G-2, Unit 7-Measuring Length) * Points to pay much attention in teaching measurement: how to apply the above approach to weight and volume * Activities for the lessons on “area” in Grade 5 * Points to pay much attention in teaching measurement   (e.g., in Area, Square 🡪 Rectangle 🡪 Parallelogram 🡪 Triangle 🡪 Trapezium) | * Applying appropriate teaching methods * Mastery of subject matter | 2 |
| Teaching methodology for mathematical relationship   * A tree map on the topics of mathematical relations (G2-G5): How do students develop their ideas about “data collection and arrangement” throughout primary education? * The lessons on “data collection and arrangement” in Grades 3 and 4: Collecting data in the class, arranging it by a bar chart, and analysing the properties of the data | * Studying on a tree map on the topics of mathematical relations (G2-G5): How do students develop their ideas about “data collection and arrangement” throughout primary education? * Activities for the lessons on “data collection and arrangement” in Grades 3 and 4: Collecting data in the class, arranging it by a bar chart, and analysing the properties of the data * Activities for the lessons on “average” in Grade 5 * Points to pay much attention in teaching average: teaching the concept of average as part of statistics, not simply as a result of addition and division | * Applying appropriate teaching methods * Mastery of subject matter | 2 |
| What is a good mathematics lesson?   * Focusing more on learning than on teaching: shifting the viewpoint from how teachers teach to how students learn * Viewpoints in lesson planning   + -How to set a lesson objective   + Lesson format of problem solving approach   + -How to design activities to facilitate students’ discovery   + -How to assess student’s learning | * Focusing more on learning than on teaching: shifting the viewpoint from how teachers teach to how students learn * How to prepare lesson plans: viewpoints in lesson planning   + How to set a lesson objective   + Lesson format of problem solving approach   + How to design activities to facilitate students’ discovery   + How to assess student’s learning * Group work (4-5 people): compare 2 lesson plans, “traditional” and “improved”, on the same topic based on the given viewpoints (\*To be continued to the next lesson) * Plenary discussion: share the result of group work and give suggestions to improve the “traditional” lesson plan | * Planning * Classroom Management | 2 |
| Preparation of lesson plans   * Instruction on the work in Lessons 17 and 18 * Writing a lesson plan on the topics given by the trainer (4-5 topics, at least 1 topic from each of 4 domains in the curriculum)   (G1-G5, Numbers, Geometry, Measurements, Mathematical Relations) | Explanation:   * Instruction on the work in Lessons 17 and 18 * Individual work: draft a lesson plan on the topics given by the trainer (4-5 topics, at least 1 topic from each of 4 strands in the curriculum) * Group discussion: share the lesson plan with other learners doing on the same topic, improve the lesson plan, and assign 1 person for presentation in Lessons 19-20 | * Planning * Classroom Management | 2 |
| Improvement of lesson plans   * Instruction on the activities in Lessons 19-20 * The lesson plan of each group for further improvement (3 groups, 15 minutes per group) | Explanation:   * Instruction on the activities in Lessons 19-20 * Presentation and discussion on the lesson plan of each group for further improvement (3 groups, 15 minutes per group) * Presentation and discussion on the lesson plan of each group for further improvement (2 groups, 15 minutes per group) * Summary of the course: reviewing what have been learnt in 20 lessons | * Planning * Classroom Management | 2 |
| 1. Assessment | * What is assessment * Why we need to assess in teaching mathematics * How to assess the students’ learning mathematics * How to develop items type questions and rubric type questions |  | Assessment, Record Keeping and Remedial Measures | 11 |
| Total | | | | 56 |