



## **B.Ed(4 Years) Elementary Education**

| Code     | Subject Title        | Cr. Hrs | Semester |
|----------|----------------------|---------|----------|
| EDE- 109 | General Mathematics  | 3       | 3        |
| Year     | Discipline           |         |          |
| 2        | Elementary Education |         |          |

### **Aims**

Research-based knowledge about good math instruction provides a solid base of information for educators to use as they identify mathematics skills students need to develop, as well as teaching strategies and instructional approaches that best support the development of these skills. The course is designed based on what research tells us about good math instruction.

This course is a comprehensive effort to build and deepen maths content knowledge, to learn and use high-quality instructional practices, and to study ways in which young students approach and learn mathematics.

### **Objectives**

Students will:

- Increase their mathematical content knowledge for Number and Operations, Algebra and Algebraic Thinking, Geometry and Geometric Measurement, and Information Handling for teaching in the primary, elementary, and middle grades
- Increase their confidence, competence, interest, and enthusiasm for mathematics by exploring and doing mathematics
- Deepen an understanding of how children learn mathematics
- Build a variety of instructional techniques with clear purposes
- Enhance their use of questioning techniques to elicit children's understanding
- Learn ways to engage students in mathematical thinking through interactive activities

### **Syllabus**

#### **Numbers and Operations**

- Counting
- Models for Addition & Subtraction with natural numbers
- Addition and Subtraction as inverse Operations
- Word problems involving addition and subtraction

#### **Place Value Numbers and Operations**

- Working in the base-10 system
- Models for Multiplication with natural numbers
- Multiplication and Division as inverse operations
- Models for Division with natural numbers
- Nature of the remainder in division
- Factors, Prime and Composite Numbers

#### **Fractions and Decimals**

- Models of fractions (sets, number line, area, volume)
- Types of fractions (proper, improper and mixed-number)
- Decimals as fractions linked to base-10 place value
- Concept of GCF and LCM
- Operations with fractions and decimals

#### **Percent Ratios and Proportion Rates**

- Percent as related to fractions and decimals
- Ratio and Proportion

- Rates

### **Integers**

- Integers, Operations with integers

### **Algebra as Generalized Arithmetic Patterns**

- Repeating patterns and growing patterns
- Generalizing a pattern and finding a rule

### **Algebraic terminology, the concept of $x$ as a variable, coordinate graphs, multiple representations, the concept of identity**

- Creating coordinate graphs
- Continuous, discontinuous, and discrete graphs
- Equivalent expressions

### **Linear functions Order of Operations**

- Interpreting tables, graphs and equations of linear functions
- The concept of slope
- Order of Operations

### **Square expressions and equations Symbol manipulation**

- Interpreting tables, graphs and equations of quadratic functions
- Solving for  $x$ , the unknown

### **Volume of Cuboids and Cylinders**

- Volume formulas Squares
- Square numbers, square roots (surds)

### **Introduction to the Pythagorean Theorem**

- The Pythagorean Theorem

### **Polygons**

- Characteristics of Polygons with an emphasis on Triangles and Quadrilaterals

### **Undefined terms in geometry Identification and construction of angles**

- Point, line, line segment, ray
- Models of angles
- Benchmark angles
- Classifying angles by measurement

### **Geometric Measurement: Area and Perimeter of polygons**

- Perimeter and Area formulas

### **Geometric Measurement: Circumference and Area of Circles**

- Surface Area of Cuboids and Cylinders
- Circumference and Area formulas
- Surface Area formulas

### **Graphic displays of information**

- Collect & organise data via: tally marks, pictographs, line plot, bar graph, and line graphs (discrete and continuous)
- Interpret the above graphic displays of data

### **Measures of dispersion and central tendency**

- Range
- Mean

- Median
- Mode

### **Text Books**

- Joseph, Y., Teh, K. S., Loh, C. Y., Ivy, C., Neo, C. M., & Jacinth, L. (2013). *New Syllabus Mathematics* (7th ed.). Singapore: Shinglee Publishers Pte Ltd.
- Monroe, K., Cetta, O., Buller, D., & Nadolny, M. (2011). *High School Math Made Simple*: TutaPoint, LLC.
- Van de Walle, J. A., Karp, K. S., Bay-Williams, J. M., Wray, J. A., & Brown, E. T. (2007). *Elementary and middle school mathematics: Teaching developmentally*.
- Haylock, D., & Manning, R. (2014). *Mathematics explained for primary teachers*. London: Sage Publications.

### **Reference Material**

- Aufmann, R. N., Barker, V. C., & Nation, R. D. (2011). *College Algebra and Trigonometry*. USA: Cengage Learning.
- Swokowski, W. (1978). *Fundamentals of algebra and trigonometry*: Prindle, Weber & Schmidt.
- Walpole, R. E. (1982). *Introduction to statistics*: Macmillan.