

MMPT Elementary Education Pathway

Background:

The Elementary Education pathway is a series of courses. Competencies in these courses focus on developing abstract and quantitative reasoning and constructing viable arguments. Deductive reasoning is an essential part of this pathway. Mathematical drawings, diagrams, manipulative materials, properties, relationships and patterns, as well as other tools may be utilized to communicate precise mathematical ideas and procedures.

Content Learning Outcomes for the Elementary Education Pathway: The content learning outcomes ensure students develop a foundation in the real number system, algebraic processes and thinking, using statistics and probability and basic Euclidean geometry. The learning outcomes fall under these topics.

I. **The Real Number System**

Students will be able to explain the real number system and evaluate operations. Specifically, students will be able to:

- Categorize numbers and apply appropriate properties to mathematical statements.
- Find the least common multiple and greatest common factor and illustrate their role in various real number operations.
- Examine and compute various computational algorithms for each of the four basic operations in base ten as well as other bases.
- Utilize the fundamental theorem of arithmetic and discuss its importance in the real number system.
- Explain the four basic operations and use them in computations with integers, fractions and decimals.
- Use order of operations.
- Solve problems involving percent, ratios and proportions.

II. **Foundations of Algebra**

Students will be able to evaluate the foundations of algebra through number, operations and algebraic thinking. Specifically students will be able to:

- Analyze patterns and functions, including arithmetic and geometric sequences through the use of words, symbols, tables, graphs and algebraic notation.
- Model and solve mathematical and real-world problems using linear and quadratic equations and their graphs.
- Solve problems, express identities and calculate with algebraic notation.

III. **Informed Decision Making**

Students will generate informed decisions through the use of probability and statistics. Specifically students will be able to:

- Organize and analyze data using descriptive and inferential statistics.
- Formulate and solve problems using experimental the theoretical probabilities (as appropriate).
- Apply counting techniques and principles to find probabilities, including compound events. Demonstrate knowledge of sampling to draw inferences.
- Construct and interpret graphical displays of data.

IV. **Basic Euclidean Geometry**

Students will examine Euclidean geometry. Specifically students will be able to:

- Solve mathematical and real world problems.
 - *Apply geometric concepts.*
 - *Similarity*
 - *Congruence*
 - *Pythagorean Theorem*
- Perform calculations involving various two-dimensional and three-dimensional objects.
 - *Perimeter*
 - *Circumference*
 - *Area*
 - *Surface area*
 - *Volume*
- Use coordinate geometry.
 - *Analyze characteristics of geometric figures.*
 - *Solve problems*
- Create geometric constructions using a compass and a straightedge to justify the following:
 - *Geometric definitions*
 - *Geometric theorems*
 - *Geometric postulates*
- Apply concepts of motion in two-dimensional space through transformations.
 - *Isometries*
 - *Dilations*