



## COURSE OUTLINE: MTH612 - MATHEMATICS

Prepared: Mathematics Department

Approved: Greg Farish - Dean

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| <b>Course Code: Title</b>  | MTH612: MATHEMATICS  |
| <b>Program Number: Name</b>  | 4061: AVIATION TECHNOLOGY  |
| <b>Department:</b>   | MATHEMATICS  |
| <b>Academic Year:</b>  | 2025-2026  |
| <b>Course Description:</b>   | Students will develop skills needed to solve problems in technical mathematics. Topics include a detailed review of algebra followed by a study of quadratic equations, exponential and logarithmic functions and trigonometric functions.                       |
| <b>Total Credits:</b>  | 4  |
| <b>Hours/Week:</b>   | 4  |
| <b>Total Hours:</b>  | 56   |
| <b>Prerequisites:</b>  | There are no pre-requisites for this course.   |
| <b>Corequisites:</b>   | There are no co-requisites for this course.  |
| <b>This course is a pre-requisite for:</b>   | MTH613   |
| <b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>  | <b>4061 - AVIATION TECHNOLOGY</b><br>VLO 1 Aviation Technology - Flight  |
| <small>Please refer to program web page for a complete listing of program outcomes where applicable.</small> |  |
| <b>Essential Employability Skills (EES) addressed in this course:</b>  | EES 3 Execute mathematical operations accurately.<br>EES 4 Apply a systematic approach to solve problems.<br>EES 5 Use a variety of thinking skills to anticipate and solve problems.<br>EES 10 Manage the use of time and other resources to complete projects. |
| <b>Course Evaluation:</b>  | Passing Grade: 50%, D<br><br>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.   |
| <b>Books and Required Resources:</b>   | Basic Technical Mathematics with Calculus by Washington<br>Publisher: Pearson Education Canada Edition: 11th<br>ISBN: 9780134289915<br><br>Casio FX-991 ES Plus 2  |



**Course Outcomes and Learning Objectives:**

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| <b>Course Outcome 1</b>                  | <b>Learning Objectives for Course Outcome 1</b>  |
| 1. Functions:                            | 1.1 Distinguish a function from other mathematical expressions or equations.<br>1.2 Make a graph of some common families of functions.   |
| <b>Course Outcome 2</b>                  | <b>Learning Objectives for Course Outcome 2</b>  |
| 2. Trigonometric Functions:              | 2.1 Convert decimal degrees to degrees, minutes, seconds, and also to revolutions.<br>2.2 Define six trigonometric ratios and calculate ratios and angles involving right triangles.   |
| <b>Course Outcome 3</b>                  | <b>Learning Objectives for Course Outcome 3</b>  |
| 3. Systems of Linear Equations:          | 3.1 Solve systems of two linear equations graphically.<br>3.2 Solve systems of two linear equations by elimination.<br>3.3 Solve systems of two linear equations by comparison.<br>3.4 Solve systems of two or three linear equations using determinants.<br>3.5 Solve word problems involving linear equations with two or three variables. |
| <b>Course Outcome 4</b>                  | <b>Learning Objectives for Course Outcome 4</b>  |
| 4. Factoring and Fractions:              | 4.1 Use factoring methods of common factoring, difference of squares, trinomials and sum and difference of cubes factoring.<br>4.2 Add, subtract, multiply and divide algebraic fractions.<br>4.3 Solve fractional equations.  |
| <b>Course Outcome 5</b>                  | <b>Learning Objectives for Course Outcome 5</b>  |
| 5. Quadratic Equations:                  | 5.1 Solve quadratic equations using the methods of factoring, the square root method, completing the square and the quadratic formula.<br>5.2 Graph quadratic functions by finding the vertex and the x and y intercepts.  |
| <b>Course Outcome 6</b>                  | <b>Learning Objectives for Course Outcome 6</b>  |
| 6. Trigonometric Functions of any Angle: | 6.1 Understand and use the CAST rule.<br>6.2 Use trigonometry to solve problems involving angles in any quadrant.<br>6.3 Explain what a radian is and convert degrees to radians and vice-versa.<br>6.4 Solve problems involving angles in radian measure.   |
| <b>Course Outcome 7</b>                  | <b>Learning Objectives for Course Outcome 7</b>  |
| 7. Vectors and Oblique Triangles:        | 7.1 Add and subtract vectors graphically and identify the component and resultant vectors.<br>7.2 Add and subtract vectors algebraically using a vector chart.<br>7.3 Solve problems involving right triangles and vectors.<br>7.4 Use the sine and cosine law to solve problems involving oblique triangles.                                |
| <b>Course Outcome 8</b>                  | <b>Learning Objectives for Course Outcome 8</b>  |



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| 8. Graphs of Trigonometric Functions:         | 8.1 Determine the amplitude, period and phase shift of a given trig function.<br>8.2 Make a sketch of any of the six trig functions studied. Include two periods.   |
| <b>Course Outcome 9</b>                       | <b>Learning Objectives for Course Outcome 9</b>   |
| 9. Exponents and Radicals:                    | 9.1 Study and apply the rules of exponents and simplify algebraic expressions involving exponents.<br>9.2 Write exponential expressions in radical form and vice-versa.<br>9.3 Perform algebraic operations on radical expressions including the conjugate radical. |
| <b>Course Outcome 10</b>                      | <b>Learning Objectives for Course Outcome 10</b>  |
| 10. Exponential and Logarithmic Functions:    | 10.1 Study and apply the properties of logarithms by expanding and simplifying logarithmic expressions.<br>10.2 Solve logarithmic and exponential equations.  |
| <b>Course Outcome 11</b>                      | <b>Learning Objectives for Course Outcome 11</b>  |
| 11. Additional Types of Systems of Equations: | 11.1 Recognize equation forms of circles, parabolas, ellipses and hyperbolas.<br>11.2 Solve systems of equations of first and second degree.  |
| <b>Course Outcome 12</b>                      | <b>Learning Objectives for Course Outcome 12</b>  |
| 12. Inequalities:                             | 12.1 Solve problems involving linear and non-linear inequalities. Draw a number line to show the solution. Use a factor chart for equations of second degree and higher.  |
| <b>Course Outcome 13</b>                      | <b>Learning Objectives for Course Outcome 13</b>  |
| 13. Variation:                                | 13.1 Define the terms ratio and proportion.<br>13.2 Reduce a ratio to lowest terms.<br>13.3 Solve ratio and proportion problems.<br>13.4 Write equations indicating direct, joint and inverse variation.<br>13.5 Solve word problems involving variation.           |

**Evaluation Process and Grading System:**

| Evaluation Type | Evaluation Weight |
|-----------------|-------------------|
| Assignments     | 20%               |
| Quizzes         | 15%               |
| Tests           | 65%               |

**Date:**

August 20, 2025

**Addendum:**

Please refer to the course outline addendum on the Learning Management System for further information.

