1. **PURPOSE**

The aim of the course is to explain, develop and nurture the basic mathematical skills required for entry into the Maritime Transportation field. Great emphasis is placed on problem solving and assisting students to overcome any basic or inherent weaknesses they might have and to bridge any gaps in their knowledge.

1. **OBJECTIVE**

See General Conditions Item 6.0

1. **GENERAL**

Course: Diploma in International Shipping and Logistics

Programme Ref: MATHS201

Course Title: Mathematics

Duration: 45

Credits: 3

1. **CONTENTS**

**UNIT ONE**

***Basic Arithmetic Skills***

* + Types of numbers
* Explain what is meant by natural, whole, real, imaginary, complex, rational and irrational numbers, integers.
  + Real numbers
* Express numbers in standard form (scientific notation), to a given number of significant figures and decimal places.
* Round off numbers.
  + Laws of arithmetic
* Explain what is meant by commutative, associative and distributive laws
  + Arithmetic operations and rules of precedence
* Apply these rules in determining the order of operation in simplifying arithmetic expressions.

**UNIT TWO**

***Basic Arithmetic Skills***

* + Fractions
* Explain what is meant by proper and improper fractions and mixed numbers
* Interconvert improper fractions and mixed numbers
* Convert a given fraction to an equivalent fraction
* Reduce a fraction to its lowest terms
  + Arithmetic operations
* Add and subtract fractions
* Multiply and divide fractions
  + Percentages
* Interconvert fractions and percentages
* Percentage change
* Perform basic consumer arithmetic calculations
* discount, sales tax, simple interest, currency conversion, etc.

**UNIT THREE**

***Units of Measure***

* + The metric system
* State the symbols and values of the more commonly used prefixes in the metric system
  + Conversion of units
* Perform conversions between metric units involving different prefixes
* Perform conversions between metric units and selected imperial units still used in the shipping industry.

**UNIT FOUR**

***Introduction to Algebra I***

* + Definitions and terminology
* Like and unlike terms, algebraic expressions, binomial, polynomial, etc.
  + Addition and subtraction of algebraic expressions
* Perform these operations on given expressions
  + Multiplication and division of single-term expressions
* Perform these operations on given expressions
  + Indices
* Apply the laws of indices to simplifying terms and expressions

**UNIT FIVE**

***Introduction to Algebra II***

* + Multiplication of Algebraic expressions
* Multiply compound expressions
  + Division of Algebraic expressions
* Divide compound expressions
  + Factorization
* Factorize expressions

**UNIT SIX**

***Equations***

* + Simple equations
* Solve given simple equations
* Solve worded problems relating to simple equations
  + Simultaneous equations
* Solve given simultaneous equations
* Solve worded problems relating to simultaneous equations
  + Quadratic equations
* Solve quadratic equations by factorization and by formula
* Solve worded problems leading to quadratic equations
  + Transposition of formulae
* Transpose given formulae to make any given variable the subject

**UNIT SEVEN**

**Functions and Graphs**

* + Functions
* Define and give examples of functions
  + Rectangular coordinate system
* Use the rectangular coordinate system to plot graphs of given functions
  + Straight line graphs
* Determine gradient and intercept of straight line plots
* State the equation *y = mx + c*
* Sketch straight line graphs given equation
  + Quadratic graphs
* State that quadratic functions produce parabolic graphs
* Sketch graphs of simple quadratic equations
  + Exponential graphs
* Sketch a typical exponential curve

**UNIT EIGHT**

***Introduction to Geometry***

* + Plane geometrical figures
* State the properties of basic plane figures
* Calculate areas and perimeters of triangles, quadrilaterals and circles
  + Solid geometrical figures
* Calculate volumes and surface areas of spheres, cubes, rectangular prisms, cylinders, cones and square pyramids

**UNIT NINE**

***Introduction to Trigonometry***

* + Trigonometric ratios
* Define these ratios in terms of the sides of a right-angled triangle
* Solve given problems on right-angled triangles
  + State and apply Pythagoras’ theorem
  + Solution of oblique triangles
* Apply the sine and cosine rules to solving plane triangles that are not right-angled.

**UNIT TEN**

***Introduction to Calculus***

* + Differentiation
* Explain that gradient is a measure of the rate of change of one variable with respect to another
* Explain that when this rate of change is not constant, differentiation allows it to be calculated at any point.
* Differentiate simple algebraic functions
  + Integration
* State that this is the reverse of differentiation
* Integrate simple algebraic functions

1. **DELIVERY**

**Methods of delivery**

* Lectures
* Team learning
* Demonstrations
* Class discussions
* Structured class exercises

1. **GENERAL CONDITIONS**

On completion of the course students should be able to:

* Understand basic arithmetical concepts
* Develop basic arithmetic skills in manipulating decimals, fractions, percentages, powers and roots
* Apply knowledge of algebra to the solution of mathematical problems
* Apply knowledge of graphs, geometry, trigonometry, calculus and other mathematical concepts relating to industry needs.

1. **EVALUATION**

**Methods of Evaluation**

* Coursework 50%
* Tests
* Assignments
* Final examination 50%

1. **SUPPORTING DOCUMENTATION**

* Course materials
* Attendance register
* Continuous assessment
* Appendix 1

**APPENDIX 1:**

**Useful References**

1. Washington, A.J. (2009). *Basic Technical Mathematics: with Calculus. 9th.ed*. New Jersey. Pearson Educational
2. Toolsie, R. (2009). Mathematics-A complete course with CXC Questions., Vol. 1. Trinidad and Tobago. Caribbean Educational Publisher (CEP).
3. Toolsie, R. (2010). Mathematics-A complete course with CXC Questions., Vol. 2. Trinidad and Tobago. Caribbean Educational Publisher (CEP).
4. Internet Sources

Course Schedule

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Week** | **Lecturer:** | **Time** |
|  | 1 | Unit 1 | 3 |
|  | 2 | Unit 2 up to percentage change | 3 |
|  | 3 | Unit 2 cont’d – Consumer Arithmetic | 3 |
|  | 4 | Unit 4 | 3 |
|  | 5 | Unit 5 | 3 |
|  | 6 | Unit 6 | 3 |
|  | 7 | Unit 6 cont’d | 3 |
|  | 8 | Mid Module Examination | 3 |
|  | 9 | Unit 3 and Unit 8 | 3 |
|  | 10 | Unit 8 cont’d and Unit 9 | 3 |
|  | 11 | Unit 9 | 3 |
|  | 12 | Unit 10 | 3 |
|  | 13 | Unit 10 | 3 |
|  | 14 | Revision | 3 |
|  | 15 | Final Examination | 3 |

**Final Exam:**