

Program Content

Semester	I	
Course Code:	IT1506	
Course Name:	Fundamentals of Mathematics	
Credit Value:	01	
Core/Optional	Core	
Hourly Breakdown	Theory	Independent Learning
	15 Hrs	35 Hrs

Course Aim/Intended Learning Outcomes:

This course provides core mathematical knowledge and skills that are essential for a student of ICT. At the completion of this course, students will be able to:

- Solve mathematical problems quickly and efficiently
- Relate the mathematical concepts to ICT

Course Content: (Main Topics, Sub topics)

Topic	Theory (Hrs)
1. Numbers and Arithmetic Operations	3
2. Basic Algebra	3
3. Solving Equations and Inequalities	3
4. Fundamentals of Measurements	3
5. Percentages and Ratios	3
Total	15

1. Numbers and Arithmetic Operations (3 hrs) [Ref 1: Pg. (1 – 33)]

1.1 Types of numbers and representation on the number line.

- 1.1.1 Positive and Negative Integers [Ref 1: Pg. (1 - 2)]
- 1.1.2 Fractions [Ref 1: Pg. (14 - 15)]
- 1.1.3 Expressing a fraction in equivalent forms [Ref 1: Pg. (15 - 18)]
- 1.1.4 Decimal Numbers [Ref 1: Pg. (26 - 30)]
- 1.1.5 Significant Figures and Decimal Places [Ref 1: Pg. (30 - 33)]

1.2 The basic arithmetic operations and the rules governing their application

- 1.2.1 Addition, Subtraction, Multiplication and Division of whole numbers [Ref 1: Pg. (2 - 5)]
- 1.2.2 BODMAS Rule [Ref 1: Pg. (5 - 7)]
- 1.2.3 Addition and Subtraction of Fractions [Ref 1: Pg. (18 - 21)]
- 1.2.4 Multiplication of Fractions [Ref 1: Pg. (21 - 23)]

- 1.2.5 Division by a Fraction [Ref 1: Pg. (24 - 25)]
- 1.3 Prime numbers and factorization [Ref 1: Pg. (7 – 9)]
- 1.4 Highest Common Factor and Lowest Common Multiple
 - 1.4.1 Highest Common Factor [Ref 1: Pg. (10 - 11)]
 - 1.4.2 Lowest Common Multiple [Ref 1: Pg. (11 - 13)]

2. Basic Algebra (3 hrs) [Ref 1: Pg. (45 – 53), (70 – 113)]

- 2.1 Algebraic terminology
 - 2.1.1 What is Algebra [Ref 1: Pg. (45 – 47)]
 - 2.1.2 Powers or Indices [Ref 1: Pg. (47 – 49)]
- 2.2 Expansion, Factorization and Evaluation of algebraic expressions
 - 2.2.1 Addition and subtraction of like terms [Ref 1: Pg. (70 – 71)]
 - 2.2.2 Multiplying algebraic expressions and removing brackets [Ref 1: Pg. (71 – 73)]
 - 2.2.3 Removing brackets from $a(b + c)$ and $a(b - c)$ [Ref 1: Pg. (73 - 75)]
 - 2.2.4 Removing brackets from $(a + b)(b + c)$ and $(a + b)(c - d)$ [Ref 1: Pg. (75 - 78)]
 - 2.2.5 Factors and common factors [Ref 1: Pg. (79 - 81)]
 - 2.2.6 Factorizing quadratic expressions [Ref 1: Pg. (81 - 85)]
 - 2.2.7 Cancelling common factors [Ref 1: Pg. (86 - 91)]
 - 2.2.8 Multiplication and division of algebraic fractions [Ref 1: Pg. (91 - 95)]
 - 2.2.9 Addition and subtraction of algebraic fractions [Ref 1: Pg. (96 - 99)]
 - 2.2.10 Partial fractions [Ref 1: Pg. (99 - 107)]
- 2.3 Formulae
 - 2.3.1 Substitution and Formulae [Ref 1: Pg. (49 – 53)]
 - 2.3.2 Rearranging a formula [Ref 1: Pg. (108 - 113)]

3. Solving Equations and Inequalities (3 hrs) [Ref 1: Pg. (114 – 125), (189 – 219)]

- 3.1 Understands linear equations and their graphs
 - 3.1.1 Solving Linear Equations [Ref 1: Pg. (114 - 117)]
 - 3.1.2 Solving Simultaneous Equations [Ref 1: Pg. (117 - 119)]
 - 3.1.3 Solving Quadratic Equations [Ref 1: Pg. (119 - 125)]
- 3.2 Inequalities and their solutions [Ref 1: Pg. (189 - 194)]
- 3.3 Solving simultaneous equations graphically
 - 3.3.1 Straight line graphs [Ref 1: Pg. (211 - 214)]
 - 3.3.2 Finding the equation of a straight line from its graph [Ref 1: Pg. (215 - 219)]
 - 3.3.3 Plotting the graph of a function [Ref 1: Pg. (194 - 197)]
 - 3.3.4 The Domain and Range of a Function [Ref 1: Pg. (197 - 201)]
 - 3.3.5 Solving Equations using Graphs [Ref 1: Pg. (201 - 204)]
 - 3.3.6 Solving simultaneous equations (graphically) [Ref 1: Pg. (204 - 210)]

4. Fundamentals of Measurements (3 hrs)

- [Ref 1: Pg. (251 – 291), (305 – 321)]
- 4.1 Measurements of length, mass, time, capacity, area and volume
 - 4.1.1 Introduction to measurement [Ref 1: Pg. (251 - 252)]
 - 4.1.2 Units of length [Ref 1: Pg. (253 - 254)]
 - 4.1.3 Area and volume [Ref 1: Pg. (254 - 257)]
 - 4.1.4 Measuring angles in degrees and radians [Ref 1: Pg. (257 - 261)]
- 4.2 Area and volume of basic geometrical shapes
 - 4.2.1 Areas of common shapes and volumes of common solids [Ref 1: Pg. (262 - 265)]

<p>4.2.2 Units of mass and time [Ref 1: Pg. (266 - 270)]</p> <p>4.3 Introduction to trigonometry, trigonometrical ratios, functions and their graphs</p> <p>4.3.1 The trigonometrical ratios [Ref 1: Pg. (271 - 274)]</p> <p>4.3.2 Finding an angle given one of its trigonometrical ratios [Ref 1: Pg. (275 - 285)]</p> <p>4.3.3 Trigonometrical functions and their graphs [Ref 1: Pg. (286 - 292)]</p> <p>4.4 Types of triangles and Solution of right-angled triangles</p> <p>4.4.1 Types of triangles [Ref 1: Pg. (305 - 307)]</p> <p>4.4.2 Pythagoras' Theorem [Ref 1: Pg. (308 - 310)]</p> <p>4.4.3 Solution of right-angled triangles [Ref 1: Pg. (310 - 313)]</p> <p>4.5 Sine and Cosine rule</p> <p>4.5.1 The Sine Rule [Ref 1: Pg. (313 - 318)]</p> <p>4.5.2 The Cosine Rule [Ref 1: Pg. (318 - 321)]</p> <p>5. Percentages and Ratios (3 hrs) [Ref 1: Pg. (34– 44)]</p> <p>5.1 Percentages [Ref 1: Pg. (34 – 39)]</p> <p>5.2 Ratios [Ref 1: Pg. (40 – 44)]</p>
<p>Teaching /Learning Methods:</p> <p>Lectures are used to introduce basic concepts and problem-solving techniques in Mathematics. You can access all learning materials and this syllabus in the VLE: http://vle.bit.lk, if you are a registered student of the BIT degree program. It is very important to participate in learning activities given in the VLE to learn this course.</p>
<p>Assessment Strategy:</p> <p>In the course, case studies/Lab sheets will be introduced, and students have to participate in the learning activities.</p> <p>The final examination of the course will be held at the end of the semester. The paper consists of 20 MCQs, and candidates have to answer all 20 questions within 1 hour.</p>
<p>References/ Reading Materials:</p> <p>Main Materials</p> <p>[Ref 1] Croft, T and Davison R (2016) Foundation Maths, 6th ed. Pearson Education</p>