Program Content

Semester	I	
Course Code:	EN1106	
Course Name:	Introductory Mathematics	
Credit Value:	02	
Core/Optional	Core	
Hourly Breakdown	**Theory**	**Independent Learning**
	30	70

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 student 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	4
3. Solving Equations and Inequalities	4
4. Fundamentals of Measurements	4
5. Percentages and Ratios	3
6. Fundamentals of Sequences and Series	5
7. Indices and logarithms	3
8. Modular Arithmetic	4
Total	30

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)]**

        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)]**
        4.2.2   Units of mass and time **[Ref 1: Pg. (266 - 270)]**

4.3 Introduction to trigonometry, trigonometrical ratios, functions and their graphs
        4.3.1   The trigonometrical ratios **[Ref 1: Pg. (271 - 274)]**
        4.3.2   Finding an angle given one of its trigonometrical ratios **[Ref 1: Pg. (275 - 285)]**
        4.3.3   Trigonometrical functions and their graphs **[Ref 1: Pg. (286 - 292)]**

4.4 Types of triangles and Solution of right-angled triangles
        4.4.1   Types of triangles **[Ref 1: Pg. (305 - 307)]**
        4.4.2   Pythagoras' Theorem **[Ref 1: Pg. (308 - 310)]**
        4.4.3   Solution of right-angled triangles **[Ref 1: Pg. (310 - 313)]**

4.5 Sine and Cosine rule
        4.5.1   The Sine Rule **[Ref 1: Pg. (313 - 318)]**
        4.5.2   The Cosine Rule **[Ref 1: Pg. (318 - 321)]**

5. **Percentages and Ratios (3 hrs) [Ref 1: Pg. (34– 44)]**
    5.1 Percentages **[Ref 1: Pg. (34 – 39)]**
    5.2 Ratios **[Ref 1: Pg. (40 – 44)]**

6. **Fundamentals of Sequences and Series (5 hrs) [Ref 1: Pg. (126 – 140)]**
    6.1 Sequences
        6.1.1   Definition of Sequences **[Ref 1: Pg. (126 – 127)]**
        6.1.2   Arithmetic progressions **[Ref 1: Pg. (128 – 129)]**
        6.1.3   Geometric progressions **[Ref 1: Pg. (130 – 131)]**
        6.1.4   Infinite sequences **[Ref 1: Pg. (132 – 133)]**
    6.2 Series
        6.2.1   Series and Sigma notation **[Ref 1: Pg. (133 – 136)]**
        6.2.2   Arithmetic Series **[Ref 1: Pg. (136 – 137)]**
        6.2.3   Geometric Series **[Ref 1: Pg. (137 – 138)]**
        6.2.4   Infinite geometric series **[Ref 1: Pg. (138 – 140)]**

7. **Indices and logarithms (3 hrs) [Ref 1: Pg. (54 – 69), (233 – 250)]**
    7.1 The Laws of indices
        7.1.1   The First Law **[Ref 1: Pg. (54 – 55)]**
        7.1.2   The Second Law **[Ref 1: Pg. (55 – 56)]**
        7.1.3   The Third Law **[Ref 1: Pg. (56 – 57)]**
    7.2 Negative powers, Fractional powers, Square roots, Cube roots
        7.2.1   Negative powers **[Ref 1: Pg. (58 – 60)]**
        7.2.2   Square roots **[Ref 1: Pg. (61 – 62)]**
        7.2.3   Cube roots **[Ref 1: Pg. (62)]**
        7.2.4   Fractional powers **[Ref 1: Pg. (62)]**
    7.3 Multiplication and division by powers of 10 **[Ref 1: Pg. (66)]**
    7.4 Scientific notation **[Ref 1: Pg. (67 - 69)]**
    7.5 Logarithms
        7.5.1   Definition **[Ref 1: Pg. (233 - 235)]**
        7.5.2   Calculate the logarithm of a number to any base **[Ref 1: Pg. (236 - 237)]**
        7.5.3   laws of logarithms **[Ref 1: Pg. (237 - 244)]**

7.5.4   Solving equations with logarithms **[Ref 1: Pg. (244 - 248)]**

7.5.5   Properties and graph of the logarithm function **[Ref 1: Pg. (248 - 250)]**

8. **Modular Arithmetic (4 hrs)**
   [Ref 2: Online, Ref 3: Online]
   8.1 Introduction to Modular Arithmetic
   8.2 Rules of Modular Arithmetic (Addition, Subtraction and Multiplication)
   8.3 Properties of Modular Arithmetic

Teaching /Learning Methods:

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 BIT degree program. It is very important to participate in learning activities given in the VLE to learn this course.

Assessment Strategy:

In the course, case studies/Lab sheets will be introduced, and students have to participate in the learning activities.

The final examination of the course will be held at the end of the semester. This course is evaluated using a one-hour written question paper which consists of 20 MCQs. To obtain a "PASS" grade for the course, a student MUST get at least 40 marks out of 100 for the MCQ written question paper.

References/ Reading Materials:

Main Materials
    [Ref 1]   Croft, T and Davison R (2016) Foundation maths, 6th ed. Pearson Education
    [Ref 2]   Modular Arithmetic. Brilliant.org. Retrieved 11:08, November 25, 2019, from
    https://brilliant.org/wiki/modular-arithmetic/
    [Ref 3]   Modular Arithmetic. en.wikibooks.org. Retrieved 25 November 2019, from
    https://en.wikibooks.org/wiki/Modular_Arithmetic/What_is_a_Modulus%3F

Supplementary Materials:
- Krantz, S. G. (2009), Discrete mathematics demystified. London: McGraw-Hill Professional.
- Rayner, D. (2005), Extended Mathematics for IGCSE: Oxford University Press.