

Name of the Program	B.A. / B.Sc. (LIBERAL EDUCATION)			Year/ Semester:	1st / 1st
Course Name	Fundamentals of Mathematics	Course Code:	MT101	Type:	Theory
Credits	05			Total Sessions Hours:	75 Hours
Evaluation Spread	Internal Continuous Assessment:	50 Marks		End Term Exam:	50 Marks
Type of Course	<input type="radio"/> Compulsory	<input checked="" type="radio"/> Core	<input type="radio"/> Creative	<input type="radio"/> Life Skill	
Course Objectives	<ol style="list-style-type: none"> As such, this interdisciplinary course attempts to teach students a few simple mathematical tools that will enhance their ability to deal with more complex, real-world problems. It will teach students to review the fundamental knowledge and understanding of the principles and nature of mathematics, identify the usage of mathematics in everyday life, and summarize mathematical and information effectively. This paper will cover concepts such as Set of real numbers, Set Theory, Trigonometry, Functions, Complex number and their applications in real life. 				
Course Outcomes (CO): <i>After the successful course completion, learners will develop following attributes:</i>					
Course Outcome (CO)	Attributes				
CO1	Learn the concept of real numbers, polynomial, operation on it and their applications in real life problem.				
CO2	Student will learn about the basic concept of set theory, operation on sets and applications.				
CO3	Students will understand the definition of the different types of angles and measure them in radians and degree. Find the length of circular arc, area of a sector, linear and angular speed of a particle.				
CO4	Students will be familiar with functions, their domain and range, type of function, Algebra of functions imaginary numbers, complex numbers and their use in real/daily life.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 20 Marks Activity: 10 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks				
Session Details	Topic			Hours	Mapped CO
Unit 1	Real Numbers: Define set of real numbers, all its subsets and their relationships. Use of arithmetic properties of subsets of numbers and closure property for basic arithmetic operations. Manipulating fractions, ratios, decimals. Manipulating percentages. Concept of Algebraic Expression. Concept of exponent laws, Concept of Radicals and their properties. Standard form of polynomials and operations on			15	CO1

	<p>polynomials. Simplifying rational expressions, rationalizing numerator and denominator. Modeling real life problems with equations, interval notation and linear inequalities.</p> <p>Activity:</p> <ol style="list-style-type: none"> 1. An easy working model of real numbers. 2. Prove of Pythagoras theorem using square through model/chart. 		
Unit 2	<p>Set Theory: Introduction to Set theory and Notations. Type of Sets, Operation on Sets, Subsets, Union, Intersection and complements of sets, Cartesian product, Venn Diagrams and their applications.</p> <p>Relation: Relations on sets, Types of relations and their properties, Partial order Relation, Equivalence Relations, Composition of relations and some important results.</p> <p>Function: Definition of Function, Domain and Range of functions, Even and Odd functions, Piece-wise defined functions and Absolute Value functions. Coordinate system, Graphical representation of a function, Algebra of functions (sum, difference, product and quotient). Domain of arithmetic combination. Composition of functions. Inverse functions.</p> <p>Activity:</p> <ol style="list-style-type: none"> 1. Draw the set and type of set on chart/model. 2. Draw graph of different type of function on chart. 	20	CO2, CO4
Unit 3	<p>Trigonometry: Angle, complementary and supplementary angle. The concept of six trigonometric ratios/functions. Introduction of trigonometric identities, trigonometric functions of some standard angles, trigonometric functions of allied angles, compound angles and application involving right triangles. Transformation of Product into Sum or Difference, Transformation of Sum and Difference into Product, Trigonometric functions of multiple angles, Trigonometric functions of sub-multiple angles, Trigonometric functions of special angles. Inverse trigonometric functions and properties</p> <p>Activity: To find the height of different type towers/buildings using trigonometric with angle of elevation/depression in university campus.</p>	20	CO3
Unit 4	<p>Complex Numbers: Introduction of a complex numbers: Integral power of IOTA (i), imaginary quantities, real and imaginary parts of a complex number. Addition, subtraction, multiplication and division of a complex number. Conjugate of a complex number. Modulus of a complex number. Reciprocal of a complex number. Square root of a complex number. Cube root of unity and properties of cube root of unity.</p> <p>Activity: Graph of complex number using graph paper.</p>	20	CO4


CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1					2			2	2			1	
CO2	2								3	1			1	
CO3	2		2			1			1				1	1
CO4	2					2			3	2			1	

Strong contribution-3, Average contribution-2, Low contribution-1,

Suggested Readings:		
Text- Books	1. Algebra and Trigonometry, 9 th edition, Ron Larson, ISBN-13:978-1-133-95974-8, ISBN-10:1-133-95974-1 2. Finite Mathematics By Raymond A. Barnett, Michael R. Ziegler, Karl E. Byleen. (10 th edition).	
Reference Books	1. Dass H. K, 2018, Introduction to Engineering Mathematics, Volume I, S. Chand and Company Ltd. 2. Kreyszig, E., 2015, Advanced Engineering Mathematics, John Wiley and Sons, INC.	
Para Text	Unit 1: 1. https://www.youtube.com/watch?v=QUGmwPwtbpg&t=427s 2. https://www.youtube.com/watch?v=w6DVUIy5H7E 3. https://www.youtube.com/watch?v=m7mlkplcCmk Unit 2: 1. https://www.youtube.com/watch?v=vGelH3Jibt4 . 2. https://www.youtube.com/watch?v=T9lt6MZKLck Unit 3: 1. https://www.youtube.com/watch?v=1EGFSeFe5II 2. https://www.youtube.com/watch?v=7ikr-PYE2aQ Unit4: 1. https://www.youtube.com/watch?v=rS9AwyRbB7g 2. https://www.youtube.com/watch?v=vwJAYTWOa0g	
Recapitulation & Examination Pattern		
Internal Continuous Assesment:		
Component	Marks	Pattern
Mid Semester	20	Section A: Contains 10 MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries 0.5 mark. Section B: Contains 07 descriptive questions out of which 05 questions are to be attempted. Each question carries 03 marks.
Activity	10	Will be decided by subject teacher.
Class Test	05	Contains 05 descriptive questions. Each question carries 01 mark.
Online Test/ Objective Test	05	Contains 10 multiple choice questions. Each question carries 0.5 mark.
Assignment/ Presentation	05	Assignment to be made on topics and instruction given by subject teacher.
Attendance	05	As per policy.
Total Marks	50	

Course created by: **Dr. Sheeba Rizvi**
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 Signature:

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 Signature: