Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Mathematics

Course Type: GE-I

Course Title: Fundamentals of Mathematics

Course Code: 101MAT1401

Credits: 04 **Max. Marks: 100** **Lectures: 60 Hrs.**

Learning Objectives:

LO 1. To study Graph of Equations
LO 2. To discuss symmetry of Graph along X axis or Y axis
LO 3. To find limit of given function
LO 4. To discuss continuity of given function
LO 5. To study derivatives of function and their applications

Course Outcomes:

After completion of course the student will be able to-

CO 1. Compute distance formula ,midpoint formula ,equation of lines ,parallel lines and perpendicular lines
CO 2. Find symmetry of graphs
CO 3. Discuss limit and continuity of given function
CO 4. Apply derivative

Unit No.	Title of Unit & Contents	Hrs.
I	**Coordinates Systems and Graphs of Equations**	**13**
	1. The coordinate of a point on a line, Absolute value, Coordinate of a point in a plane 2. Distance formula, Midpoint Formulas 3. Graphs of equation, Straight line, Slope, Equation of a line, parallel lines, perpendicular lines.	
	Unit Outcomes: UO 1. Explore the graphs of functions, interpret the graph and its nature. UO 2. Familiarize with the different methods of finding limit and continuity of functions.	
II	**Intersection of Graphs, Symmetry and Functions**	**15**
	1. Intersection of graphs, Symmetry, Symmetry about a line, Symmetry about a point 2. Functions and their graphs, Notation of a function 3. Intervals, Even and Odd functions, Zeros of polynomial.	
	Unit Outcomes: UO 1. To understand various aspects of functions.	
III	**Limit and Continuity**	**16**
	1. Limits, Properties of limits, Existence or Non-existence of a limit, One sided limit, Infinite limits, limits at infinity.	

	2. Continuity, Definition and properties of continuity, One sided continuity, Continuity over a closed interval.	
	Unit Outcome: UO 1. Learn how to solve the problems related to limit and continuity with the help of given illustrations.	
IV`	**Derivatives and Applications**	**16**
	1. The slope of tangent line, Derivative, Differentiability and Continuity, Further rules for derivatives. 2. Maximum and Minimum problems, Relative Extrema, Absolute Extrema. 3. Chain rule, Composite Function, Implicit differentiation.	
	Unit Outcomes: UO 1. Determine the nature of some stationary points using either the first or second derivative tests. UO 2. Find stationary points of some functions.	

Learning Resources:

1.Schaum's Outline of Theory and problems of Beginning Calculus, Elliott Mendelson, Third Edition, Tata McGraw-Hill publishing company limited (2008).

2. Differential Calculus for Beginners, Joseph Edwards, Arahant publication(2023).

3. Thomas' Calculus , George B. Thomas , Eleventh Edition (2004).

4. Introduction to Calculus , J. H. Heinbockel ,First Edition ,(2012).

5. Calculus and Analytical Geometry by George B. Thomas, Jr. And Ross L. Finney , Sixth Edition (Pearson) .

6. Textbook of Analytical geometry of two-dimension P.K Jain. Khalil Ahemad., Third Edition new age international private limited (2021).