

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).