SEMESTER – V

MIC-05: Theory of Real Functions

Course Outcomes

After the completion of the course, the student will be able to understand:

CO1: The concept of limit of a function.
CO2: The geometrical properties of continuous functions on closed intervals.
CO3: The applications of mean value theorem.

<table>
<tr><td colspan="3">MIC-05: Theory of Real Functions
(3 credits)
Full Marks-100</td></tr>
<tr><td>Unit</td><td>Topics to be covered</td><td>No. of Lectures</td></tr>
<tr><td>1</td><td>Limit of functions, Sequential criterion for limits, Divergence criteria, Limit theorems, One-sided limits, Infinite limits and limits at infinity.</td><td>08</td></tr>
<tr><td>2</td><td>Continuous functions, Sequential criterion for continuity and discontinuity, Algebra of continuous functions, Properties of continuous functions on closed intervals.</td><td>10</td></tr>
<tr><td>3</td><td>Differentiability of a function, Algebra of differentiable functions, Increasing and Decreasing functions, Sign of derivatives, Darboux's theorem, Intermediate value theorem for derivatives, Rolle's theorem, Lagrange's and Cauchy's Mean value theorem and their applications.</td><td>12</td></tr>
<tr><td></td><td>TOTAL</td><td>30</td></tr>
</table>

Book References:

1. Bartle, Robert G., & Sherbert, Donald R. (2015). Introduction to Real Analysis (4th ed.). Wiley India Edition. New Delhi.
2. Ross, Kenneth A. (2013). Elementary Analysis: The theory of calculus (2nd ed.). Undergraduate Texts in Mathematics, Springer. Indian Reprint.
3. Malik, S. C. & Arora, S. (2021). Mathematical Analysis (6th ed.). New Age International Publishers, New Delhi.
4. Jha,K.K. Advanced Course in Real Analysis and Higher Analysis. New Bharat Publishing House.