19BSM101–Calculus-I										
Teaching Scheme					**Examination Scheme**					
L	**T**	**P**	**C**	**Hrs/Week**	**Theory**			**Practical**		**TotalMarks**
					MS	**ES**	**IA**	**LW**	**LE/Viva**	
3	**--**	**--**		**3**	**25**	**50**	**25**	**--**	**--**	**100**

OBJECTIVES

1. Learn to find and use limits of functions of single variable.
2. Learn to find the derivatives of elementary algebraic functions and trigonometric functions.
3. Learn to use derivatives for graphing algebraic and trigonometric functions and to solve optimization problems.
4. Get acquainted with the concept of sequence and series, and learn to analyze the convergence of the same.
5. Learn the techniques to handle the intermediate forms of limits.
6. Learn to sketch graphs for different functions.

SYLLABUS

UNIT I	**11**
Formal definition of Limits, continuity, derivative of a function, differentiation rules, rates of change, derivatives of trigonometric functions, inverse trigonometric functions, exponential function, logarithmic functions, higher order derivatives, related rates of change.	
UNIT II	**11**
Extreme values of functions, local vs absolute extrema, mean value theorems (Rolle's theorem, Lagrange's mean value theorem, Cauchy mean value theorem), First derivative test for local extreme values, concavity/convexity, points of inflection, second derivative test for local extreme values.	
UNIT III	**10**
Sequence, monotone sequence, Infinite series, tests for convergence, the comparison test, the ratio test, the root test, the logarithmic test, alternating series, absolute and conditional convergence, power series, Taylor and Maclaurin series.	
UNIT IV	**8**
L'Hospitals rule and intermediate forms, curve tracing (Cartesian, polar and parametric).	
APPROXIMATE TOTAL	**40 Hours**

OUTCOMES

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1. Student will analyze and evaluate limits (including infinite limits) graphically, numerically, and analytically.
2. Student will memorize and apply basic differentiation rules.
3. Student will apply differentiation techniques to find tangent lines, normal lines, and rates of change.
4. Student will evaluate derivatives by implicit differentiation
5. Student will apply differentiation techniques to evaluate higher order derivatives.
6. Student will apply differentiation techniques to identify (relative and absolute) extrema.
7. Student will apply Rolle's Theorem and Mean Value Theorem
8. Student will identify relative extrema by using the first and second derivative tests.
9. Student will decide the convergence of a given series.
10. Student will apply differentiation techniques to find intervals of in/decreasing and concavity.
11. Student will demonstrate knowledge of curve sketching.

TEXTS AND REFERENCES

1. H. Anton, I. Bivens, S. Davis, Calculus: Early Transcendentals, Tenth Edition, John Wiley and Sons.
2. George B. Thomas and Ross L. Finney, Calculus and Analytic Geometry, 9th Edition, Peaerson.
3. E. Mendelson, Beginning Calculus, Third Edition, Schaum's Series.

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