19MA 101T MATHEMATICS I										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs./Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	---	4	4	25	50	25	---	---	100

COURSE OBJECTIVES:

1. To understand the concept of single variable calculus, length and area of curve, surface area and volume of solids of revolution.
2. To apply the knowledge of multi variable calculus to evaluate mass, centre of gravity and moment of inertia.
3. To understand and analyse convergence and divergence of infinite series, improper integrals using beta and gamma functions.
4. To apply the concept of vector calculus for evaluating multiple integrals by Green's, Stoke's and Divergence theorem.

UNIT- I **[10]**

Calculus for single variable: Successive differentiation, Leibnitz theorem (without proof), Taylor's and Maclaurin's expansion of functions of single variable. Fundamental theorem of Integral calculus, Application of integrals to length, area, volume and surface area of revolution. **Curve Tracing:** Asymptotes, Cartesian, polar and parametric forms.

UNIT- II **[12]**

Calculus for of Several variable: Partial derivatives, Euler's theorem, directional derivative and gradient, Taylor's and Maclaurin's expansion of functions of several variables, Maxima and minima of functions of several variables, Lagrange's method of undetermined multipliers, Multiple Integrals – double and triple, Jacobian, Change of order of integration, change of coordinates, evaluation of area, volumes of solids, Mass, center of gravity and moment of inertia.

UNIT- III **[9]**

Infinite Series & Improper Integrals: Convergence and divergence of Infinite series. Comparison test, D' Alembert's ratio test, Raabe's test, logarithmic test, Cauchy's root test. Alternating series; Leibnitz test, power series. Convergence of improper integrals, Beta and Gamma functions and its properties.

UNIT- IV **[8]**

Vector Calculus: Scalar and vector fields, Line and surface Integrals, Gradient divergent curl, Green's Theorem and Stoke's theorem (without proof) with application and physical significance.

Tutorials **[13]**

TOTAL **52 Hours**

Text Book & References:

1. B. S Grewal, Higher Engineering Mathematics, (43rd Edition), Khanna Pub., Delhi (2014).
2. James Stewart, Calculus (5th Edition), Thomson (2003).
3. R. K. Jain & S. R. K. Iyengar, Higher Engineering Mathematics, (5th Edition), Narossa publication

COURSE OUTCOMES:

1. Apply the knowledge of single variable calculus to evaluate length and area of curves, surface area and volume of solids of revolution.
2. Apply the knowledge of multi variable calculus to evaluate mass, centre of gravity and moment of inertia.
3. Understand and analyze convergence and divergence of infinite series for evaluating improper integrals using beta and gamma functions.
4. Apply the concept of vector calculus for evaluating multiple integrals by Green's, Stoke's and Divergence theorem.