

MA 101 T MATHEMATICS I										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs./Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	---	7	4	30	60	10	---	---	100

#### UNIT I

8

**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

11

**Calculus of Several variables:** 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

11

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

#### UNIT IV

9

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

**APPROXIMATE TOTAL 39 Hours**

#### Texts and References

1. B. S. Grewal, Higher Engineering Mathematics, 42<sup>nd</sup> Ed., Khanna Publishers (2013).
2. James Stewart, Calculus, 5<sup>th</sup> Ed., Thomson (2003).
3. R. K. Jain & S. R. K. Iyengar, Higher Engineering Mathematics, 3<sup>rd</sup> Ed., Narosa (2007).
4. George B. Thomas Jr., Maurice D. Weir, Joel R. Hass, Thomas' Calculus, 12<sup>th</sup> Ed., Pearson (2010).
5. E. Kreyszig, Advanced Engineering Mathematics, 8<sup>th</sup> Ed., John Wiley (1999).
6. Michael D. Greenberg, Advanced Engineering Mathematics, 2<sup>nd</sup> Ed., Pearson (1998).