

## CC101: CALCULUS

**CREDITS = 5 (L=3, T=2, P=0)**

**Course Objectives:** The basic necessity for the Foundation of Engineering & Technology being Mathematics, the main aim is, to teach Mathematical methodology, develop Mathematical skills & enhance thinking power of students.

### Teaching and Assessment Scheme:

Teaching Scheme			Credits	Marks Distribution				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE	CE	ESE	CE	
3	2	0	5	70	30	30	20	150

### Course Contents:

Unit. No.	Topics	Teaching Hours
1	<b><u>Differential Calculus and its Applications:</u></b>  Reorientation of Calculus. Differentiation of Hyperbolic and Inverse Hyperbolic Functions. Successive Differentiation, Standard forms, Leibniz's Theorem (Without Proof) and Applications. Taylor Series and Maclaurin Series Expansions; Errors and Approximation, Indeterminate forms.	08
2	<b><u>Tracing of Curves:</u></b>  Tracing of Cartesian, Polar and Parametric form of Standard Curves.  Reduction formulae of $\int_0^{\frac{\pi}{2}} \sin^n x dx$ , $\int_0^{\frac{\pi}{2}} \cos^n x dx$ , $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx$ (Statements Only)  Applications to Find Area, Volume of Standard Curves.	10
3	<b><u>Infinite Series:</u></b> Sequence and Their Convergence, Convergence and Divergence of Infinite Series, Geometric Series, P-Test, A Necessary Condition for Convergence, Comparison Test, Ratio Test.	08

4	<b><u>Partial Differentiation and its Applications:</u></b> Partial and total Differential Coefficient, Euler's Theorem, Geometrical Interpretation of Partial Derivative, Jacobian, Taylor's Expansion for Two Variables, Errors and Approximations, Maxima and Minima of Function of Two Variables, Lagrange's Method of Undetermined Multipliers to Determine Stationary Values.	10
5	<b><u>Multiple Integral and its Applications:</u></b> Double Integrals, Evaluation, Change of The Order of Integration for Cartesian Coordinates, Change in Polar Coordinates, Evaluation of Triple Integrals, Application to find Area and Volume.	08
	<b>Total Hours</b>	<b>44</b>

#### List of References:

1. Weir, M.D. et al., *Thomas' Calculus (11th Edition)*, Pearson Education, 2008.
2. Grewal B. S., "*Higher Engineering Mathematics*", Khanna Publisher, New Delhi, (Latest Edition).
3. Sastry S. S., "*Engineering Mathematics – Vol. I and II*", Prentice Hall of India.
4. Stuart J., "*Calculus*", Cengage Learning, India Pvt. Ltd. (2008).

#### Course Outcomes (COs):

On successful completion of the course, students will be able to:

1. Acquire knowledge of advanced differential calculus for single variable and their applications.
2. Get acquainted with the knowledge of functions of several variables.
3. Learn differential and integral calculus of several variables.
4. Apply knowledge of differential and integral calculus of several variables for engineering applications.