

Course No	Title of the Course	Course Structure	Prerequisite
FCMT001	MATHEMATICS-I	3L-1T-0P	None
<b>COURSE OUTCOMES (COs)</b>			
After completion of this course, the students are expected to be able to demonstrate the following knowledge, skills and attitudes:			
<ol style="list-style-type: none"> <li>1. Analyze the concepts of limit, continuity and differentiability of functions and find the series representation of single variable functions.</li> <li>2. Computation of partial derivatives, total derivatives and maxima/minima of a function of two or more variables.</li> <li>3. Learn curve tracing of a function and apply definite integrals to evaluate area, length, surface area and volume of revolution in different coordinate systems.</li> <li>4. Evaluation of double and triple integrals and their applications to find area, mass and volume. Study of special types of improper integrals such as gamma and beta functions.</li> <li>5. Study and analyze the convergence of infinite series.</li> </ol>			
<b>COURSE CONTENT</b>			
<b>Unit 1: Function of Single Variable:</b> Limit, continuity and differentiability of functions, Hyperbolic functions, inverse hyperbolic function, successive differentiation, Leibniz theorem, Taylor's, and Maclaurin's theorems (without remainder terms).			
<b>Unit 2: Function of Several Variables:</b> Limit, continuity and Partial Derivatives, Euler's Theorem, Total differentiations, Change of Variables, Jacobian and its basic properties, Taylor's theorem, Maxima and Minima for functions of two or more variables, Lagrange's method of undetermined multipliers.			
<b>Unit 3: Application of Integrals:</b> Asymptotes and curve tracing (in Cartesian), area, length, surface area and volume of revolution (Both in Cartesian and polar coordinates), Improper integrals: Gamma and beta function.			
<b>Unit 4: Multiple Integrals:</b> Evaluation of double integral (in Cartesian and polar coordinates), change of order of integration, change of variables, Triple integral (in Cartesian) and its applications.			
<b>Unit 5: Infinite Series:</b> Tests for convergence of series: p-series (with proof), Comparison, Ratio, Raabe's, Logarithmic and Cauchy's nth root (all tests without proofs), Alternating series, Leibniz test, Absolute convergence, Conditional convergence.			
<b>SUGGESTED READINGS</b>			
1. G.B. Thomas, Calculus and Analytic Geometry, Pearson Education, 2010.			
2. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Publication, 2011.			
3. Michael Greenberg, Advanced Engineering Mathematics, Pearson Education, 2021			
4. R. K. Jain and S. R. K. Iyenger, Advanced Engineering Mathematics, Narosa Publication, 2002			
5. B. S. Grewal, Higher Engineering Mathematics, Khanna Publication, 2010.			