CLUSTER UNIVERSITY SRINAGAR

MATHEMATICS
Semester – I

Syllabus for B.A./B.Sc., Mathematics, Semester-I

Course title: Differential calculus & complex trigonometry (6 credits)
Course code: MA-17101

Unit-I

Limit and Continuity (ϵ-δ definition), types of discontinuities, properties of continuous functions on closed intervals, differentiability of functions, Successive differentiation, Leibnitz's theorem, partial differentiation, Euler's theorem on homogenous functions.

Unit-II

Tangents and normals (polar coordinates only), pedal equations, curvature and radius of curvature, asymptotes, singular points.

Unit-III

Rolle's theorem, Mean value theorems, Taylor's theorem with Lagrange's and Cauchy's forms of remainders, Taylor's series, Maclaurin's series of $\sin x$, $\cos x$, e^x, $\log(1+x)$, $(1+x)^n$, indeterminate forms.

Unit-IV

Complex trigonometry: De Moivre's theorem and its applications, expansion of $\sin n\theta$, $\cos n\theta$ etc. in terms of powers of $\sin\theta$, $\cos\theta$ and expansion of $\sin^n\theta$ and $cos^n\theta$ in terms of multiples of $\sin\theta$, $\cos\theta$. Functions of a complex variable, exponential, circular, hyperbolic, inverse hyperbolic and logarithmic functions of a complex variable and their properties.

Text Books Recommended

(1) *Differential Calculus* by S.D. Chopra, M.L. Kochar & A. Aziz-ul-Auzeem, Kapoor publications.

(2) *Differential Calculus* by Shanti Narayan, S. Chand publishing.

(3) *Complex trigonometry* by A. Aziz and N.A. Rather, KBS.

(4) *Complex trigonometry* by M.R Puri.

Suggested Readings

(1) *Calculus Early Transcedentals* by James Stewart, Cengage.

(2) *Calculus I* by Tom M. Apostol, Wiley.