

# SYLLABUS MATHS BIT

## UNIT-1: Functions Limits and Continuity(5Hrs)

- Functions and Their graphics
- Combining functions
- Shifting and Scaling Graphs
- Trigonometric Functions
- Graphing with the Calculator and computers
- Exponential Functions
- Inverse Functions and logarithms
- Rates of the change and Tangents to Curves.

## Unit2: Limits and Continuity (3hrs)

- Limit of a function and Limit law
- The precise definition of a limit
- One-sided limits
- Continuity
- Limit Involving infinity; Asymptotes of Graphics

## Unit3 : Differentiations (5hrs)

- Tangents and the Derivate at a Point
- The derivative as a function
- The derivative as a Rate of Change
- Derivative of Trigonometric Functions
- The Chain rule
- Implicit Differentiation
- Derivatives of the Inverse function and Logarithms
- Inverse Trigonometric Functions
- Related rates

## Unit4: Application of Derivatives (5hrs.)

- Extreme values of functions
- The Mean value theorem
- Monotonic functions and the first derivative test
- Concavity and Curve Sketching
- Indeterminate forms and L'Hospital's rule
- Applied optimization
- Newton's method

## Unit5: Integration (5hrs)

- Antiderivatives
- Area and estimating with finite sums
- Sigma notation and Limits of finite sums
- The definite integral
- The fundamental theorem of calculus
- Indefinite integrals and the substitution method
- Substitution and Area between Curves

## Unit6: Application of Definite integrals (3hrs.)

- Volumes using Cross Sections
- Volumes using the cylindrical cells
- Arc Length
- Areas of surfaces of revolution
- Work and fluid forces
- Moments and centers of Mass

## Unit7: Techniques of Integrations(5hrs)

- Integration by parts
- Trigonometric integrals
- Trigonometric substitution
- Integration of rational functions by partial fractions
- Integrals tables and computer algebra systems
- Numerical integration
- Improper integrals

## Unit8: First order Differential Equations (4hrs)

- Solutions
- Slope fields
- Euler's method
- First order linear equations
- Applications
- Graphical solutions of Autonomous Equations
- Systems of equations and phase planes

## Unit9: Infinite Sequence and Series (5hrs)

- Sequences
- Infinite series
- The integral set
- Comparison tests
- The Ratio and roots test
- Alternating series
- Absolute and Conditional Convergence
- Power series
- Taylor and Maclaurin series
- Convergence of Taylor series

## Unit10 : Partial Derivatives (5hrs)

- Functions of several variables
- Limits and Continuity in Higher dimensions
- Partial Derivatives
- The chain rule
- Directional derivatives and gradient vectors
- Tangent planes and differentials
- Extreme values and saddle points Lagrange multipliers
- Taylor's formula for two variables
- Partial Derivatives with constrained variables