

## ST1 C04: MATHEMATICAL METHODS FOR STATISTICS

### UNIT I

Sequences and series, convergence, continuity, uniform continuity, differentiability. Functions of several variables: maxima and minima, Method of Lagrangian multipliers, Riemann integral, Laplace transform and its applications to differential equations.

### UNIT II

Measurable space and sets, Measure and measure space, finite and  $\sigma$  finite measures. Counting measure, Lebesgue measure, Lebesgue- stieltjes measure and general measure, Measurable functions.

### UNIT III

Lebesgue integral. General definition of integral of a measurable function and its elementary properties. Fatou's lemma. monotone convergence theorem, Lebesgue dominated convergence theorem.

### UNIT IV

Algebra of complex numbers, Analytic functions, Cauchy-Riemann equations, contour integral, Cauchy's theorem (without proof), Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Zeroes of a function, singular point, different types of singularities, residues at a pole.

### Text Books:

1. Apostol T.M. (1996) Mathematical Analysis, second Edition, Narosa Publishing House, New Delhi.
2. Churchill R.V (1975) Complex variables and applications, McGraw Hill.

### Reference Books:

1. Andre's I. Khuri (1993) Advanced Calculus with applications in statistics. Wiley & sons.
2. Malik S.C & Arora S (2006) Mathematical analysis, second edition, New age international.
3. Pandey H.D, Goyal J. K & Gupta K.P (2003) Complex variables and integral transforms Pragathi Prakashan, Meerut.