# Table of Contents Key Points of Units

## **Unit-1 Complex Analytic Functions**

#### **Unit 1-1 Complex Number**

Mathematics of Complex Numbers Polar Form of Complex Numbers Euler's Equation Powers and Roots of Complex Numbers Topology and Complex Numbers

### **Unit 1-2 Complex Analytic Functions**

Definition and Expression of Complex Functions Limit of a Complex Function Continuity of a Complex Function Differentiability of a Complex Function Analyticity of a Complex Function Cauchy-Riemann Equations Laplace Equations and Harmonic Conjugate for an Analytic Function

### **Unit 1-3 Complex Elementary Functions**

Partial Fractional Decomposition Complex Exponential Functions Complex Trigonometric Functions Complex Hyperbolic Functions Complex Logarithmic Functions Branch and Branch Cut Complex Powers and Inverse Trigonometric Functions

## **Unit -2 Complex Integration**

Contour and Parameterizing Contour Contour Integral ML Inequality Topology of Paths Cauchy Integral Theorem Line Integration of Analytic Functions (Independence of Path) Deformation of Contour Cauchy Integral Formula Cauchy Integral Formula for Derivatives Cauchy's Inequality and Liouville's Theorem

### **Unit-3 Complex Series**

Divergence Theorem Absolute Convergence Comparison Test Ratio Test Root Test Power Series Circle and Radius of Convergence Mathematics of Power Series Taylor's Theorem Expansion of Maclaurin and Taylor Series Laurent's Theorem Expansion of Laurent Series

## **Unit-4 Residue Integration**

Singularity Zeros and Poles of Order n Residue Cauchy's Residue Theorem Trigonometric Integration Improper Integral and Cauchy Principal Value Cauchy Principal Value of the Integral of Rational Functions Jordan's Lemma Integral of Indented Contour of Rational Functions Integration Along a Branch Cut Summing Infinite Series Argument Principal and Winding Number Rouche's Theorem Laplace Transform and Inverse Laplace Transform Fourier Transform and Inverse Fourier Transform

## **Unit-5 Conformal Mapping**

•••