Module Code: MATH-303
Module Title: **Complex Analysis - I**
Module Rating: 3 Cr. Hours

The Concept of Analytic Functions

- Complex numbers, complex planes, complex functions
- Analytic functions
- Entire functions
- Harmonic functions
- Elementary functions: complex exponential, logarithmic and hyperbolic functions

Infinite Series

- Power series, derived series, radius of convergence
- Taylor series and Laurent series

Conformal Representation

- Transformation, conformal transformation
- Linear transformation
- Möbius transformations

Complex Integration

- Complex integrals
- Cauchy-Goursat theorem
- Cauchy's integral formula and their consequences
- Liouville's theorem
- Morera's theorem
- Derivative of an analytic function

Recommended Books

1. D. G. Zill and P. D. Shanahan, *Complex Analysis*, (Jones and Bartlett Publishers, 2003)
2. H. S. Kasana, *Complex Variables: Theory and Applications*, (Prentice Hall, 2005)
3. J. W. Brown and R. V. Churchill, *Complex Variables and Applications,* 7th edition, (McGraw Hill Company, 2004)
4. M. R. Spiegel, *Complex Variables*, (McGraw Hill Book Company, 1974)
5. Louis L. Pennisi, *Elements of Complex Variables*, (Holt, Linehart and Winston, 1976)

CHAIRMAN
Department of Mathematics
University of the Punjab
Lahore-Pakistan