

Semester III

Subject Name: Complex Analysis	Duration: 5 hrs /Cycle
Subject Code: 3PGM1(2015 on)	Credit : 4
Unit I: Complex Functions: Introduction to the Concept of Analytic Function - Limits and Continuity - Analytic Functions - Polynomials - Rational Functions - Elementary Theory of Power Series - Sequences - Series - Uniform Coverage's - Power Series - Abel's Limit Theorem	
Unit II: Analytic Functions as Mappings: Conformality - Arcs and Closed Curves - Analytic Functions in Regions - Conformal Mapping - Length and Area - Linear Transformations - The Linear Group - The Cross Ratio – Symmetry.	
Unit III: Complex Integration: Fundamental Theorems - Line Integrals - Rectifiable Arcs - Line Integrals as Functions of Arcs - Cauchy's Theorem for a Rectangle - Cauchy's Theorem in a Disk - Cauchy's Integral Formula - The Index of a Point with Respect to a Closed Curve - The Integral Formula - Higher Derivatives.	
Unit IV: Local Properties of Analytical Functions: Removable Singularities - Taylor's Theorem - Zeros and Poles - The Local Mapping - The Maximum Principle. - The General Form of Cauchy's Theorem - Chains and Cycles - Simple Connectivity - Homology - The General Statement of Cauchy's Theorem - Proof of Cauchy's Theorem - Locally Exact Differentials - Multiply Connected Regions.	
Unit V: The Calculus of Residues: The Residue Theorem - The Argument Principle - Evaluation of Definite Integrals- Harmonic Functions - Definition and Basic Properties - the Mean-value Property - Poisson's Formula - Schwarz's Theorem - the Reflection Principle.	

Text Book: Complex Analysis by Lars Ahlfors, 3rd edition, McGraw - Hill International Editions (1979). Chapters: 2(sec. 1, 2), 3(sec. 2, 3 (3.1 to 3.3 only)), 4(sec. 1- 3, .4 (4.1 to 4.5 only), 5, 6.

Reference Books: 1. Complex analysis by V. Karunakaran, 2nd Edition 2009, Narosa Publications.

2. Functions of Complex Analysis: Theory and Applications by K.K. Dube, I
K International Publishing House Pvt. Ltd. (2009).