PROGRAME NAME: : B.Sc. (H) Mathematics
COURSE NAME : Complex Analysis
SEMESTER DURATION : January to May

Week	Topic(s)	Teaching Methodology Adopted/ Continous Internal Evaluation
1	Functions of complex variable, Mappings, Mappings by the exponential function	Demonstration
2	Limits, Theorems on limits, Limits involving the point at infinity, Continuity	Lectures / Discussions
3	Derivatives, Differentiation formulae, Cauchy-Riemann equations, Sufficient conditions for Differentiability	Lectures
4	Analytic functions, Examples of analytic functions, Exponential function	Presentations
5	Logarithmic function, Branches and Derivatives of Logarithms, Trigonometric functions	Assignments
6	Derivatives of functions, Definite integrals of functions, Contours	Lectures
7	Contour integrals and its examples, upper bounds for moduli of contour integrals	Discussions / Assignments
8	Antiderivatives, proof of antiderivative theorem	Lectures
9	State Cauchy-Goursat theorem, Cauchy integral formula	Tutorials
10	An extension of Cauchy integral formula, Consequences of Cauchy integral formula, Liouville's theorem and the fundamental theorem of algebra.	Presentation
11	Convergence of sequences, Convergence of series, Taylor series, proof of Taylor's theorem, Examples	Lectures / Discussions
12	Laurent series and its examples, Absolute and uniform convergence of power series, uniqueness of series representations of power series.	Lectures
13	Isolated singular points, Residues, Cauchy's residue theorem, Residue at infinity.	Discussions
14	Types of isolated singular points, Residues at poles and its examples	Demonstrations

Course Objectives: This course aims to introduce the basic ideas of analysis for complex functions in complex variables with visualization through relevant practicals. Particular emphasis has been laid on Cauchy's theorems, series expansions and calculation of residues.

Course Learning Outcomes:
The completion of the course will enable the students to:

i) Understand the significance of differentiability of complex functions leading to the understanding of Cauchy-Riemann equations.
ii) Evaluate the contour integrals and understand the role of Cauchy-Goursat theorem and the Cauchy integral formula.
iii) Expand some simple functions as their Taylor and Laurent series, classify the nature of singularities, find residues and apply Cauchy Residue theorem to evaluate integrals.