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| 1. | Title of the course | Complex Analysis |
| 2. | Course number | MA601L |
| 3. | Structure of credits | 3-0-0-3 |
| 4. | Offered to | PG |
| 5. | New course/modification to | Modification To MA6105/7 |
| 6. | To be offered by | Department of Mathematics and Statistics |
| 7. | To take effect from | July 2022 |
| 8. | Prerequisite | Nil |
| 9. | **Course Objective(s):** To explore the algebraic, geometric and topological structures of the complex number field. To introduce the concepts of analyticity, Cauchy-Riemann relations, harmonic functions, Complex integration and complex power series. To classify isolated singularities and examine residue theory. To illustrate the applications of residue theory in the evaluation of integrals | |
| 10. | **Course Content:** Complex numbers, geometric representation, stereographic projection, Sequences and series, Power series, Radius of convergence. Elementary functions. Limits, continuity and differentiability, Analytic functions, Cauchy Riemann equations, Taylor Series. Line integral, Cauchy's integral theorem, Cauchy's integral formula, Liouville's theorem, Fundamental Theorem of Algebra, Maximum Modulus Principle and Morera's theorem.Zeros and singularities, Laurent series, Residue theory and its application to integrals, Casorati Weierstrass theorem, Picard's Theorem (without proof), Argument principle, Rouche's theorem and Mobius transformation. | |
| 11. | **Textbook(s):**<br>1. Gamelin T W, *Complex Analysis*, Springer Verlag (2001). | |
| 12. | **Reference(s):**<br>1. Stein E M, and Shakarchi R, *Complex Analysis (Princeton Lectures in Analysis)*, Princeton University Press (2003).<br>2. Conway J B, *Functions of one Complex Variable I*, Springer (1978).<br>3. Ahlfors L, *Complex Analysis*, McGraw Hill (1979).<br>4. Ponnusamy S, and Silverman H, *Complex Variables with Applications*, Birkhauser, Boston (2006). | |