

Semester - III

ADVANCED TOPICS IN THE ANALYTICAL THEORY OF FUNCTIONS

Course No. MM-CP-306
Duration of Examination: 3 hrs

Maximum Marks: 100
(a) External Exam: 80
(b) Internal Exam: 20

Unit I

Space of analytical functions, Hurwitz's theorem, Montel's theorem, Riemann Mapping theorem.

Gamma function and its properties, Riemann Zeta function, Riemann's functional equation, Runge's theorem, Harnack's inequality and theorem. Dirichlet problem, Green's function.

Unit II

Factorization of an integer functions. Weirstrass factorization theorem, Order of an entire function. Exponent of convergence, Functions of finite order, the function $n(r)$, where $n(r)$ denotes the number of zero's z_1, z_2, \dots of an integral function for $|Z| \leq r$, If r_1, r_2, \dots are the moduli of the zero's of $f(z)$, then $\sum r_n^{-\alpha} < \infty$, if $\alpha > \rho$, the range of an analytic function.

Unit III

Canonical products, Hadmard factorization theorem, the order of a canonical product is equal to the exponent of convergence of its zero's. the theorem of Lagurre concerning an integral function $f(z)$, which is real for real z and of order less than 2 with real zero's, the a -points of an analytic function.

Unit IV

Block's theorem, Schotlky's theorem, the Little Picard theorem viz, An integral function which is not a constant takes every value with one possible exception, Landau's theorem, Montel's Cartheodary theorem and the Great Picard's theorem, Meromorphic functions, Mittag-Leffler theorem and related results.

References:

1. L.Ahlfors: Complex Analysis
2. E.C. Titchmarsh : Theory of Functions
3. J.B.Conway : Functions of a complex variable –I
4. Richard's Silverman : Complex Analysis
5. A.I.Markushevish : Theory of Functions of a Complex variable
6. Nihari Z. : Conformal Mapping.
7. H.A. Priestly : Introduction to Complex Analysis.
8. S.Lang : Complex Analysis.
9. E.Hille : Analytic Function Theory (2- vol).
10. Liang –Shin Hahn, Bernard Epstein : Classical Complex Analysis.
11. D.Sarason: Complex Function Theory
12. W.H.J.Fuchs : Topics in the Theory of Functions on one Complex Variable.