

2009 - 2010

SSP-5127

**DEPARTMENT OF PHYSICS
ANDHRA UNIVERSITY**

Common for M.Sc. Physics and M.Sc. Space Physics
I Semester(w.e.f 2009-10 batch)
P103,SP103: Mathematical Methods of Physics

Unit I : Complex Variables

Function of complex number- definition-properties, analytic function-Cauchy -Riemann conditions-polar form-problems, Complex differentiation, complex integration -Cauchy's integral theorem- Cauchy's integral formulae-multiply connected region- problems, Infinite series-Taylor's theorem- Laurent's theorem-Problems, Cauchy's Residue theorem- evaluation of definite integrals-problems.

Text Book: 1.Mathematical Methods of Physics-G.Arffen,Academic Press

2.Mathematical Physics-Satya Prakash, Sultan Chand & co,New Delhi

3.Complex Variables (Schaum's out line series) Murray R.Spiegel

Ref Book: Mathematical Methods B.D.Gupta

Unit II : Beta , Gamma functions &Special functions

Beta & Gamma functions -definition, relation between them- properties-evaluation of some integrals

Special Functions- Legendre Polynomial, Hermite Polynomial, Laguerre Polynomial-Generating function-recurrence relations-Rodrigue's formula-orthonormal property-associated Legendre polynomial- simple recurrence relation-orthonormal property-spherical harmonics

Text Book: 1.Mathematical Methods of Physics-G.Arffen,Academic Press

2.Mathematical Physics-Satya Prakash, Sultan Chand & co,New Delhi

3. Mathematical Physics B S Rajput

Ref book: Special Functions M.D.Raisinghania

Unit III : Laplace Transforms & Fourier series, Fourier Transforms

Laplace Transforms - definition- properties - Laplace transform of elementary functions-Inverse Laplace transforms-properties- evaluation of Inverse Laplace Transforms-elementary function method-Partial fraction method-Heavyside expansion method-Convolution method-complex inversion formula method-application to differential equations Fourier series-evaluation of Fourier coefficients- Fourier integral theorem-problems-square wave-rectangular wave-triangular waveFourier Transforms- infinite Fourier Transforms-Finite Fourier Transforms- Properties-problems-application to Boundary value problem

Text Book: 1.Mathematical Methods of Physics-G.Arffen,Academic Press

2.Mathematical Physics-Satya Prakash, Sultan Chand & co,New Delhi

3. Laplace n Fourier Transforms Goyal & Gupta.

Ref books: Integral Transforms M.D.Raisinghanna
Integral Transforms Goyal & Gupta

Unit IV: Numerical Analysis

Solutions of algebraic and Transcendental equations-Bisection method-method of successive approximations-method of false position Iteration method-Newton Rapson method Simultaneous linear algebraic equations-Gauss elimination method-Gauss Jordan method-Matrix inversion method-jacobi method - Gauss-Siedel method Interpolation with equal intervals-Finite differences-Newton Forward & Backward Interpolation formulæ Interpolation with unequal intervals-Newtons divided difference formula-Lagrange interpolation formula Numerical Integration-General Quadrature formula-Trapezoidal rule -Simpson's 1/3 rule & 3/8 rule

Text Books: Introductory methods of Numerical analysis S.S.Sastry
Numerical Methods V.N.Vedamurthy & N.Ch.S.N.Iyengar