Subject Code : P8MAE7

METHODS OF MATHEMATICAL PHYSICS

UNIT I

Boundary value problems and series solution - Examples of boundary value problems - Eigen values, eigen functions and the Sturm-Liouville problem - Hermitian operator, their eigen values and eigen functions.

UNIT II

Bessel functions - Bessel functions of 'the second kind, Hankel functions Spherical Bessel functions - Legendre polynomials - Associated Legendre polynomials and spherical harmonics.

UNIT III

Hermite polynomials - Laguerre polynomials - The Gamma function - The Dirac Delta function

UNIT IV

Non homogeneous boundary value problems and Green's function - Green's function for one-dimensional problems - eigen function expansion of Green's function - Fourier transform method of constructing Green's function.

UNIT V

Green's function in higher dimensions - Green's function for Poisson's equation and a formal solution of electrostatic boundary value problems ~ Wave equation with source - the quantum mechanical scattering problem.

TEXT BOOK(S)

[1] P.K. Chattopadhyay -Mathematical Physics, Wiley Eastern Limited, 1990.

Unit I : Sections 4.2 to 4.5
Unit II : Sections 5.1 to 5.5
Unit III : Sections 5.6 to 5.9
Unit IV : Sections 6.1 to 6.4
Unit V : Sections 6.5. to 6.8.

REFERENCE(S)

[1] B.D. Gupta, Mathematical Physics, Vikas Publishing House Pvt Ltd, New Delhi, 1993.
[2] Goyal AK Ghatak, Mathematical Physics- Differential Equations and Transform Theory, McMillan India Ltd, 1995.
[3] Kryzeg, Higher Engineering Mathematics.