

AMAE-01 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

UNIT-1 PARTIAL DIFFERENTIAL EQUATIONS

- 1.1 Formation of partial differential equations
- 1.2 Singular integrals
- 1.3 Solutions of standard types of first order partial differential equations
- 1.4 Lagrange's linear equation
- 1.5 Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT-2 FOURIER SERIES

- 2.1 Dirichlet's conditions
- 2.2 General Fourier series
- 2.3 Odd and even functions
- 2.4 Half range sine series- Half range cosine series
- 2.5 Complex form of Fourier series- Parseval's identity- Harmonic analysis.

UNIT-3 APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

- 3.1 Classification of PDE
- 3.2 Method of separation of variables
- 3.3 Solutions of one dimensional wave equation
- 3.4 One dimensional equation of heat conduction
- 3.5 Steady state solution of two dimensional equation of heat conduction (excluding insulated edges).

UNIT-4 FOURIER TRANSFORMS

- 4.1 Statement of Fourier integral theorem- Fourier transform pair-
- 4.2 Fourier sine and cosine transforms- Properties- Transforms of simple functions
- 4.3 Convolution theorem- Parseval's identity.

UNIT-5 Z - TRANSFORMS AND DIFFERENCE EQUATIONS

- 5.1 Z- Transforms- Elementary properties
- 5.2 Inverse Z- transform (using partial fraction and residues)
- 5.3 Convolution theorem- Formation of difference equations-
- 5.4 Solution of difference equations using Z - transform.

References Books:

1. Bali.N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 7th Edition, Laxmi Publications Pvt Ltd , 2007.
2. Ramana.B.V., "Higher Engineering Mathematics", Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 2008.