15 MAMC 204 Partial Differential Equations (3-0-0)

Module-I (10 Hours)

PARTIAL DIFFERENTIAL EQUATIONS OF 1ST ORDER: Formation and solution of PDE-Integral surfaces- Cauchy problem for 1st order equation-orthogonal surfaces-First order non linear-characteristics compatible system-Charpits Method. Classification of second order PDE-Canonical forms- Adjoint operators-Riemann's method.

Module-II (10 Hours)

ELLIPTIC DIFFERENTIAL EQUATIONS: Derivation of Laplace & Poisson equation-BVP-Separation of variables-Dirichlets and Newmann problem for a rectangle-Solution of Laplace equation in Cylindrical and spherical coordinates-Examples.

PARABOLIC DIFFERENTIAL EQUATIONS: Formation and solution of Diffusion equation-Dirac-Delta function- Separation of variables method-Solution of Diffusion equation in Cylindrical and spherical coordinates-Examples.

Module-III (10 Hours)

HYPERABOLIC DIFFERENTIAL EQUATIONS: Formation and solution of one dimensional wave equation-Canonical reduction-D'Alembert's solution-IVP and BVP for two dimensional wave equation-Periodic solution of one dimensional equation in Cylindrical and spherical coordinates-Uniqueness of the solution for the wave equation-Duhamel's Principle-Examples.

TEXT BOOK:

K.Sankar Rao, Introduction to Partial Differential Equations, 2nd Edition, Prentice Hall of India, New Delhi,2005

Chapters:0(0.4-0.11,(omit 0.11.1)),1(1.1-1.5),2(2.1,2.2,2.5-2.7,2.10-2.13),3(3.1-3.7,3.9),4(4.1-4.12 omit (4.5,4.6 & 4.10)).

Reference Books

1. R.C.McOwen, Partial Differential Equations, 2nd Edition, Pearson Education, New Delhi, 2005.

2. I.N.sneddon, Elements of Partial Differential Equations, McGraw Hill, New Delhi, 1983.

3. R.Dennemeyer, Introduction to Partial Differential Equations and Boundary Value Problems, McGraw Hill, New York, 1968.

4. M.D.Raisinghania, Advanced Differential Equations, S.Chand & Company Ltd, New Delhi.2001