MA 409: Partial Differential Equations (3-1-0:4)

Partial differential equations (PDE) of first order, Cauchy problem, linear first order PDE, method of characteristics, Lagrange, Charpit's and Jacobi's methods.

PDE of second order, classification of second order equations, hyperbolic, parabolic and elliptic equations, linear second order equations with constant coefficients.

Parabolic differential equations, one dimensional diffusion equation, method of separation of variables, solutions in cylindrical and spherical domains, maximum modulus principle.

Hyperbolic differential equations, one dimensional wave equation, solution of one dimensional wave equation, forced vibrations, solution of non-homogeneous equations, initial boundary value problem of two dimensional wave equation.

Elliptic differential equations, two-dimensional Laplace's equation in rectangular and polar coordinates, maximum principle, Green's function method.

Text Books and References:

1. I. Sneddon, "Elements of Partial Differential Equations", Dover Publications Inc
2. G. B. Folland, "Introduction to Partial Differential Equations", Arihant
3. S. J. Farlow, "Partial Differential Equations for Scientists and Engineers", Dover Publications Inc
4. D. Greenspan, "Introduction to Partial Differential Equations",Dover Publications Inc
5. A. N. Tikhonov and A. A. Samarskii, "Equations of Mathematical Physics",Dover Publications Inc
6. R.Haberman, "Elementary Applied Partial Differential Equations: With Fourier Series and Boundary Value Problems", Prentice Hall.