**MA\*725 Partial Differential Equations**

First order partial differential equation, linear and quasi-linear first order equations, method of characteristics, general first order equation, Cauchy problem for second order p.d.e. characteristics, canonical forms, Cauchy problem for hyperbolic equations, one dimensional wave equation, Riemann function, Banach spaces, linear functions and linear operators, Fredholm alternative in Banach spaces, the Fredholm alternative in Hilbert spaces, elements of potential theory, fundamental solutions, the maximum principle, Dirichlet problem for the disc, single and double layers, Poisson’s equations,. Study of the Dirichlet problem, Greens function and separation of variables, Green’s function of a second order differential operator, Eigen functions expansions, the heat equation.

**References:**

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2. R. McOwen: Partial Differential Equations, Methods and Applications, Pearson Education, 2002.
3. L. Evans: Partial Differential Equations, Graduate Studies in Mathematics, AMS, 2010.
4. W. E. Willams, Partial Differential Equations, Oxford, 1980.
5. G. B. Folland, Introduction to partial differential equations. Princeton University Press, 1995.
6. J. Rauch, Partial differential equations. Graduate Texts in Mathematics, 128. Springer-Verlag, 1991.