A.A. 2010/11

Applied Partial Differential Equations (6 cfu)

LAUREA MAGISTRALE IN INGEGNERIA MATEMATICA

Linear first order PDE's. Method of characteristics. Nonlinear transport. The Burgers' equation. Shocks and rarefaction waves. Riemann problem for scalar conservation laws.
Partial differential equations of second order. Well posed problems, IBV problems.
The heat equation. Derivation, maximum principle, fundamental solution. The Fourier transform method.
Laplace's and Poisson's equations. Maximum principle, fundamental solution and Green's functions.
The wave equation. One dimensional equation, fundamental solution and D'Alembert formula. Fundamental solution in three dimension and strong Huygens' principle, Kirchoff's formula.

Exam: Written and oral

Books

Lawrence C. Evans, *Partial Differential Equations*, Gradute Studies in Mathematics, Volume 19. American Mathematical Society
S. Salsa. *Partial Differential Equations in Action. From Modelling to Theory*, Springer, 2008.

Teaching material

http://www.mathmods.eu/downloads/cat_view/221-university-of-laquila/225-ronghua-pan