Partial Differential Equations 1MA216.

Course Webpage:
`http://www.math.uu.se/~gaidash/1MA216/1MA216.html`

Lecturer:
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Objectives of the course:

1) On completion of the course, the student should know and be able to do the following
   - central properties of solutions to Laplace's equation, the heat equation and wave equations;
   - solve non-linear equations of the first order with the method with characteristics;
   - Sobolev spaces and central properties of Sobolev functions like theorems concerning approximation, extension and traces as well as the Sobolev inequalities and theorems concerning compactness;
   - existence - and uniqueness theorems of weak solutions to elliptic equations of the second order;
   - regularity theory, maximum principles and eigenvalues/eigenfunctions for the elliptic equations of the order;
   - theory of the parabolic and hyperbolic equations of the second order;
   - explain and use the theory of calculus of variations and, in particular, the concept of minimizer and to account for the regularity of minimizers;
   - use the concept of viscosity solution;
   - Cauchy-Kovalevskaya theorem.
2) Solve representative problems in the above-mentioned topics.
4) Understand and be able to explain/present some applications of the theory.

Textbooks:
Primary text: Fritz John. Partial Differential Equations, Springer-Verlag, New York, 1995.

Secondary text: Robert C. McOwen, Partial Differential Equations, Methods and Applications, Prentice Hall/Pearson Education, Inc., 2003 (Second Edition).

Bits and pieces from: Lawrence C. Evans. Partial Differential Equations, AMS, Providence, RI. Series: Graduate Studies in Mathematics, Vol. 19, 1998.

Grading:
One final, 5 hours, 100% of the grade.