School of Mathematics

MA342H — Partial differential equations (methods and applications) 2011-12
(JS & SS Mathematics
SS Theoretical Physics
SS Two-Subject Moderatorship)

Lecturer: Prof. P. Karageorgis

Requirements/prerequisites: MA2326 (Ordinary differential equations)

Duration: Hilary Term, 11 weeks

Number of lectures per week: 3.

Assessment: Homework counting 10% towards the final result (90% for the final exam).

ECTS credits: 5

End-of-year Examination: 2-hour examination in Trinity Term

Description:

I. Solution techniques. Separation of variables, method of characteristics.

II. Classical equations. Derivation of transport, heat, wave and beam equations.

III. Boundary value problems. Dirichlet and Neumann conditions, Fourier series.

IV. Eigenvalue problems. Rayleigh quotient, properties of eigenvalues, completeness.

V. Calculus of variations. Critical points, Euler-Lagrange equations, first and second variation, Legendre's condition, Noether's theorem.

Textbooks:

1. *Partial differential equations, an introduction*, by Walter Strauss.
2. *Calculus of variations*, by Gelfand and Fomin.

January 19, 2012