

**IPPT PAN DOCTORAL STUDY
TEACHING PROGRAMME**

WARSAW 2013/2014

Differential Equations in Natural Sciences

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The objective of the course is to give an introduction to the theory of both ordinary and partial differential equations with some applications in natural sciences.

Main topics:

1. Existence theorems and properties of solutions to systems of linear ordinary differential equations.
2. Systems of nonlinear ordinary differential equations.
3. Introduction to partial differential equations.
 - a. Existence theorems and properties of solutions to linear elliptic equations.
 - b. Existence theorems and properties of solutions to linear parabolic equations.
4. Nonlinear theory: fixed point methods, sub- and super-solution methods.
5. Traveling waves for systems of parabolic equations.
6. Some specific applications.

The total number of lecture hours: 30, laboratory exercises: 0 hours, self-teaching: 15, direct tutoring and consultations: 10 hours.

ECTS Points: 2