

DEPARTMENT OF ECONOMICS

PhD Programme in Economics

Academic Year 2025–2026

Mathematics– PhD Course

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Course description

The course provides PhD students in Economics with a unified set of mathematical tools that are widely used in modern economic theory and applied work. The focus is on linear algebra, multivariate calculus, optimization (with and without constraints) and dynamic methods (differential equations and dynamic optimization).

Course contents

The course covers the following topics:

1. Linear algebra
2. Topology in \mathbb{R}^n
3. Quadratic forms
4. Functions on \mathbb{R}^n : basic definitions and differential calculus
5. Unconstrained optimization
6. Constrained optimization: equality and inequality constraints
7. Differential equations: ODE, PDE, growth models in economics and finance
8. Systems of differential equations
9. Dynamic optimization: control theory

Assessment

The final grade will be based on written tests covering the topics presented in the course.

Admission to the exam

To be admitted to the final exam (individual project), students must have attended at least 80% of the lectures.