PhD Course in Mathematical Sciences

The PhD in Mathematical Sciences at the University of Padova, offers an advanced course of studies with two curricula: Mathematics and Computational Mathematics.

The programme has two curricula from which the students can choose: Mathematics and Computational Mathematics. The fields covered in the two curricula are: Algebra, Mathematical Analysis, Mathematical Physics, Geometry, Logic (Mathematics curriculum), Probability, Numerical Analysis, Optimization (Computational Mathematics curriculum).

Each academic year 6-8 fellowships are offered to Italian and International applicants by the Italian Ministry of Education, University and Research (MIUR), the Cariparo Foundation and through European Research grants (e.g. European Community ITN SADCO Network, Algant Network).

Two extra fellowships are awarded each year by the China Scholarship Council to candidates from the People’s Republic of China who are also welcome to apply to the regular fellowships.

Info for applicants from the People’s Republic of China:

china.phd@unipd.it
The PhD programme in Mathematical Sciences at the University of Padova is a highly advanced course of studies in the area of Mathematics and its Applications.

Students develop their studies according to their interests and under the direct supervision of one or more Faculty members. They are addressed to attend also International schools, meetings and conferences from the first year of studies, supported by additional funding.

Advanced courses are offered by the Department of Mathematics each year, taught by Faculty members or by well-known international specialists.

Students become part of a research group of the Department where they pursue a research project. They are immediately exposed to advanced research problems of current international interest in the area of Mathematics and its Applications and can become part of the International research groups connected with the Department.

Students receive a broad training to be prepared for a research job in public or private institutions, both academic and non-academic.

---

**Curriculum in Mathematics**

- Additive Categories, Representation Theory, Group Theory
- Algebraic and Complex Analysis
- Algebraic Geometry, Number Theory
- Calculus of Variations, Geometric Measure Theory, Optimal Control and Differential Games
- Celestial Mechanics and KAM Theory, Hamiltonian Systems
- Foundations of Logic
- Functional and Harmonic Analysis
- Partial Differential Equations

**Curriculum in Computational Mathematics**:

- Mathematics for economics: differential games and quantitative finance
- Operation research: integer programming, combinatorial optimization and applications to traffic flow
- Stochastic processes and applications to finance, physics and biology.

---

**Courses in “Computational Mathematics” curriculum:**

- Introduction to Delay Differential Equations
- Computational Methods for Inverse Problems and Applications in Image Processing
- Topics in Stochastic Analysis
- Numerical stability of dynamical systems described by delay differential equations
- Recent advances in Finance and Stochastics
- Nonlinear optimization: Derivative-free methods

---

**Courses in “Mathematics” curriculum:**

- A soft introduction to algebraic entropy
- Nonlinear wave equations and applications
- Calculus of Variations with applications to Materials Science
- Tropical Geometry
- Differential and Riemannian Geometry
- Introduction to Mean-Field Games.

---

**Examples of classes previously offered**

- Random perturbation of differential equations
- Geometric approaches to optimization
- Numerical methods for Ordinary Differential Equations
- Introduction to Hamilton-Jacobi equations