

The M.Sc. in Mathematics at Trento

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In a Nutshell

Basic Info

The Department of
Mathematics

The Curricula

Introduction

Pure Maths

Computational
Algebra, Crypto,
Codes

Maths and Biology

Maths and Finance

. . . is available at

<http://science.unitn.it/~caranti>

Just Google *Andrea Caranti* and feel lucky.

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- The University of Trento offers the M.Sc. in Mathematics entirely in English.
- It lasts two years = 120 credits. (1 credit \sim 7 hours in the classroom.)
- About 12 courses. Course size: 6/9/12 credits. (Plenty of choices — see later)
- 30 credits for thesis and internship.

- The M.Sc. is supported by a strong Department of Mathematics, consisting of 35-odd people.
- The main fields of Mathematics are well covered. (Algebra, Geometry, Analysis, Probability and Statistics, Logic, Mathematical Physics, Numerical Analysis.)
- There is a widespread interest in real-world applications of Mathematics. (See later.)

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- Several curricula are available.
- Depending to the curriculum, students are encouraged to take courses not only in Maths, but also in
 - Physics
 - Computer Science
 - Telecommunications
 - Economics, Finance
 - Biology
 - ...

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- Of course we offer a curriculum in Pure Mathematics!
- This may be followed by a PhD in Trento or elsewhere.
- Several of our former students now hold academic positions in Italy and abroad.
- Some titles of recent theses:
 - The isoperimetric problem in the Minkowski plane.
 - Strategies for solving the interpolation problem posed in the Guruswami-Sudan decoding algorithm.
 - Tropical geometry.
 - The Jacobian conjecture.
 - The minimal model program.
- Sample courses:
 - Advanced Analysis
 - Advanced Geometry
 - Computational Algebra
 - Stochastic Processes
 - Numerical Analysis of PDE
 - Mathematical Physics

Computational Algebra, Cryptography, Coding Theory

- It includes courses covering
 - Methods of modern computational algebra.
 - Public-key and symmetric cryptography.
 - The theory and practice of error-correcting codes.
 - Discrete Fourier Analysis.
 - Digital signal processing.
 - Multimedia signal processing and communication.
 - Data hiding.
- Internships at leading companies in the field are available.

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- This curriculum builds on the expertise of a research group of the Department in applications of Mathematics to Biology and Medicine.
- Among others, it covers the mathematical modelling of epidemics, vaccinal strategies, etc.
- Some courses on offer:
 - Biomathematics
 - Data analysis and exploration
 - Biology
 - Simulation of biological systems
 - Advanced topics in biomathematics
 - Data mining for biological data
 - Machine learning
- Internships at public institutions and private companies are available.

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- This curriculum builds on the expertise within the Department of Mathematics on the Mathematics of financial methods, such as *options pricing*.
- External experts bring in first-hand expertise on practical applications.
- Sample courses:
 - Integral Transforms
 - Stochastic Processes
 - Statistics of Stochastic Processes
 - Data analysis and exploration
 - Stochastic Differential Equations
 - Mathematical Finance
 - Numerical Methods for Finance
 - Basic Economics
- Internships, typically at research centres of banks, are available.