UNIVERSITÀ DI TRENTO
Dipartimento di Matematica

# Manifesto degli Studi del
# Corso di Laurea Magistrale in Matematica
# a.a. 2025-2026

*Approvato dal Consiglio di Dipartimento il 16 Aprile 2025*

## *1. Activation*

The Department of Mathematics offers the Master of Science in Mathematics (*Corso di Laurea Magistrale in Matematica)*, belonging to the class "LM-40 - Matematica". This program provides in-depth knowledge and understanding of various areas of advanced mathematics and their connections to other sciences. All courses in the Master of Science in Mathematics are taught in English.

## 2. Curricula

The Master of Science in Mathematics is organized into four *curricula:*

- **Advanced Mathematics**
- **Cryptography**
- **Mathematics and Statistics for Life and Social Sciences**
- **Teaching and Scientific Communication**

Every student is required to formally choose one of the curricula and follow the corresponding rules as stated in the *Regolamento Didattico della Laurea Magistrale in Matematica.* Advisors of studies are available for each curriculum. Any change of curriculum is subject to verification of the Teaching Committee.

## 3. Admission requirements

To apply to the Master of Science in Mathematics, a student must meet both formal requirements and demonstrate adequate academic preparation. The following information is required and must be provided according to the instructions on the website:

- The curriculum (or curricula) the applicant is interested in;
- A detailed study plan of the bachelor's degree, including course titles and syllabi;
- An official document from the university that issued the bachelor's degree, reporting in Italian or English the list of courses taken, the grades obtained, and the final degree mark;
- Work and professional experiences;
- Proof of English language proficiency at a B2 level or higher, certified by an internationally recognized organization or the university that issued the bachelor's degree;
- A motivation statement explaining why the applicant wishes to apply to the chosen curriculum of the Master of Science in Mathematics and what they expect from it.

As for the formal requirements, a bachelor's degree of at least three years is mandatory. This degree must ensure a solid foundation in mathematics, including at least linear algebra, mathematical analysis, and some of their applications.

These formal requirements are met by students who hold a bachelor's degree in the class *L-35 – Scienze Matematiche* or a degree with at least 60 credits in MATH sectors. Credits in PHYS (FIS/), STAT (SECS-S/), and INFO/01-A (INF/01) sectors may also be considered for courses with a strong mathematical focus.

The applicant's knowledge and skills are evaluated by the Admission Committee of the Department of Mathematics. This evaluation may include a written examination and/or an interview. Details on the admission procedure can be found on the website.
Students are admitted to one or more of their chosen curricula or to a different one, as decided by the Admission Committee. Some students may be required to follow a specific study plan.

## 4. Study plan

Students must submit a study plan that meets the requirements of their chosen curriculum, as outlined in the *Regolamento Didattico*. A valid study plan must include at least 120 credits, distributed across the following categories: core courses (*caratterizzanti*), complementary courses (*affini*), free-choice courses (*liberi*), language courses, and Stage/Thesis.
This document presents, for each curriculum, predefined study plans (called tracks) that are suggested to students and approved by default. Students also have the option to create a personalized study plan within their curriculum, provided it complies with the *Regolamento Didattico* and receives approval from the Teaching Committee.
Students are not allowed to repeat activities already completed in their previous academic career.
Through an agreement with the University of Verona, students may propose a study plan that includes courses from the Master's Degree in Mathematics at that university. Additionally, under an agreement with SMI (*Scuola Matematica Interuniversitaria*), students who attend a Summer School and pass the related exam may receive credit recognition, subject to approval by the Teaching Committee.

## 5. Safety courses

The online courses Health and Safety in the Workplace – General Risk Training (4 hours) and Health and Safety in the Workplace – Specific Risk Training (Low Risk) (4 hours) are mandatory for all students attending courses held in computer and/or teaching labs. These courses are available through Didattica Online. For students enrolled in Experimental Physics Laboratory at High School Level I and/or II, the Specific Risk Training (Low Risk) course is replaced by the Safety in the Laboratory course. This course must be included in the study plan (code 140551). Activities provided by other departments or Stage activities may have additional safety training requirements.

## 6. Foreign languages

**For students already enrolled in the academic year 2024-25**
The rules of the Manifesto 2024-25 apply: students are required to get a B2 certificate of English (3CFU). In case the student has already used a B2 certificate of English to get 3CFU in the bachelor's degree, then he/she must obtain 3 CFU with a C1 certificate of English or a B1 certificate of French, German or Spanish or with the course Scientific Writing and Presentations in English.

**For students enrolling in the academic year 2025-26**
Students are required to obtain 3 CFU by presenting a C1 English certificate or a B1 certificate in French, German, or Spanish, or by completing the course *Scientific Writing and Presentations in English*.

The certification rules are set by CLA. In particular, the score in each skill must be at least 6/10.

# 7. Important notices

The courses marked with (*) will be offered in the academic year 2025/2026 but not in the academic year 2026/2027. The Core courses and the courses marked with (**) not activated (N.A.) in the academic year 2025/26 will be activated in the academic year 2026/27.

The courses listed in the left-hand column will no longer be offered and will be replaced by the equivalent courses listed in the right-hand column.
Students which have such a course in their study plan do not need to replace it, can take the examination with the old syllabus and register the grade with the old.
Students cannot have both version of these courses in their study plan.

| **OLD COURSE** | **NEW COURSE** |
|---|---|
| Algebraic Cryptography mod 1 | Symmetric cryptography and finite fields |
| Algebraic Cryptography mod 2 | Public-key and post-quantum cryptography |
| Advanced Cryptography | Advanced Public-key Cryptography |
| Advanced Coding Theory | Advanced Symmetric Cryptography |
| Advanced Topics in Biomathematics | Spatial Models in Biology and Epidemiology |
| Advanced Group Theory | Advanced Algebra |
| Theoretical Biomechanics (9 CFU) | Theoretical Biomechanics (6CFU)<br>Modelling in Biomechanics (3CFU) |

For the students enrolled in the tracks Modelling and Simulation for Biomedical Applications and Modelling, Statistics and Analysis of Biosystems the rules of the Manifesto 2024-25 apply. In particular, the following courses will be activated in 2025-26, but they will no longer be offered in the following academic years:

| | | | | | | |
|---|---|---|---|---|---|---|
| 145428 | Computational Haemodynamics | 9 | 72 | MATH-05/A | II.1 | Lucas Omar Müller |
| 145331 | Mathematical Aspects of Bioelectromagnetism and Imaging | 6 | 42 | MATH-05/A | II.1 | Ana María Alonso Rodríguez |

# The *curriculum* Advanced Mathematics

### *Prerequisites*

Students are supposed to have a basic knowledge of the following topics and a good understanding of some of them:

- Algebra (groups and rings, ideals, quotients, isomorphism theorems);
- Geometry (general and algebraic topology, topological and differentiable manifolds, projective geometry);
- Complex Analysis (in one variable);
- Measure Theory (Lebesgue measure and integration theory);
- Ordinary Differential Equations and basic examples of Equations (Laplace, heat and wave equations); Functional Analysis (Banach and Hilbert spaces, linear operators);
- Basics of approximation techniques in Numerical Analysis;
- Classical foundations of Mathematical Physics; Probability (axiomatic construction).

Graduates will be in high demand in business-oriented environments, where problem-solving and analytical skills are highly valued. Students can among the following t*racks*:

- ***General Advanced Mathematics***
- ***Advanced Algebra and Geometry***
- ***Calculus of Variations, Partial Differential Equations and Dynamical Systems***

### *Advanced Algebra and Geometry*

This track has a strong focus on Algebra, Geometry and their interactions, such as in algebraic geometry. In particular, a firm grasp of core algebraic and geometric notions will be required, such as groups, rings, multivariate polynomials, linear algebra, projective geometry, topological spaces, functions of one complex variable. Students will have the opportunity to develop a research thesis a on Commutative Algebra, Computational Algebra, Lie Theory, Group Theory, Algebraic Curves, Algebraic Surfaces, Higher Dimensional Algebraic Varieties, Real, Complex and Quaternionic Geometry.
The high specialization of this track makes it well-suited for pursuing PhD studies in Italy or abroad and for applying to international fellowships in Pure and Applied Mathematics.

### *Calculus of Variations, Partial Differential Equations and Dynamical Systems*

This track has a strong focus on subjects as: Calculus of Variations, Partial Differential Equations (mainly theoretical but also numerical), Ordinary Differential Equations and Dynamical Systems.
Beyond the general prerequisites of the Curriculum in Advanced Mathematics, eligible students should have a firm grasp of core topics in Analysis such as: standard notions of ordinary differential equations (linear systems and nonlinear Cauchy problem), basic notions of Partial Differential Equations (Laplace, heat and wave equations, classification), elements of Real Analysis (Lebesgue measure theory, Lebesgue integration theory, $L^p$ spaces), first elements of Banach and Hilbert spaces, basic probability theory, basic differential geometry.

The students of this track will have the possibility to develop a research thesis on Calculus of Variations, Analysis in metric spaces, Dynamical Systems, geometrical aspects of Partial Differential Equations, Nonlinear Partial Differential Equations, Optimal Control, Numerical Analysis of Partial Differential Equations. The high specialization of this track makes it well-suited for pursuing PhD studies in Italy or abroad and for applying to international fellowships in Pure and Applied Mathematics.

# The *curriculum* Cryptography

### *Prerequisites*

This curriculum has a strong focus on algebra and its applications to coding theory and cryptography. In particular, a firm grasp of core algebraic notions will be required, such as the notion of groups, rings, multivariate polynomial and the arithmetic of finite fields. The ideal candidate is also expected to have some familiarity with geometry, number theory, and probability.
For the stage-oriented track, also some basic programming notions will be useful, such as conditional statements, loops, and functions, as is a willingness to learn and apply more advanced concepts in unfamiliar programming languages.
For the research-oriented track, more advanced algebra will be useful, such as fluency in Galois theory and number theory.
In this highly specialized curriculum, the students will receive an introduction to modern methods in Computational Algebra, with an emphasis on its main real-life applications:
According to their own inclination, the students are free to choose between two options:

- ***Stage-oriented***
- ***Research-oriented***

#### *Stage-oriented*

This track is especially aimed at students who wish to work in a company's security department. Typically, security departments of banks hire our graduates, but IT companies and security-focused firms also find their training highly relevant. This track complements a solid algebraic background with both applied courses, such as Algebraic Cryptography, Applied Cryptography, and Coding Theory and Applications, as well as practical Computer Science courses, such as Java programming (*Laboratorio di Programmazione*) and Introduction to Computer and Network Security.
An internship is available for all students. It can be either external, in a company, or internal, within the Laboratory of Cryptography, on a project proposed by a company.

#### *Research-oriented*

This track is especially aimed at students interested in mathematical research in Applied Algebra, with a focus on Cryptography and Coding Theory, who are willing to pursue a PhD in Mathematics in these subjects.

# The *curriculum* Mathematics and Statistics for Life and Social Sciences

### *Prerequisites*

Students are supposed to have a basic knowledge on the following topics and a deep comprehension of some of them:

- General Topology;
- Measure Theory (Lebesgue measure and integration theory);
- Functional Analysis (Banach and Hilbert spaces, linear operators, ordinary differential equations, Fourier series);
- Ordinary and Partial Differential Equations
- Numerical Analysis;
- Probability (including its axiomatic construction);
- Mathematical Statistics.
- Some basic programming notions will be useful, as is a willingness to learn and apply different programming languages.

Students are invited to choose between the following options, which are called tracks*:*

- ***Mathematics for Data Science***
- ***Mathematics for Biology and Medicine***
- ***Modelling, Statistics and Analysis in Mathematical Finance***

It is also possible for a student to present a personal study plan that may cover applications of mathematics to different fields such as finance, economics, engineering or others. Such a study plan is subject to approval by the Teaching Committee*.*

#### *Mathematics for Data Science*

Students who take this track will have the opportunity to learn the theoretical and computational foundations of Mathematics for Data Science, including advanced tools in Probability, Mathematical Statistics, Machine Learning and Deep Learning. The track equips students with the knowledge and skills needed to tackle challenges in modelling high dimensional and complex data sets, which are frequently encountered in environmental, biological, social and economic fields.
This track is ideal for students seeking a Ph.D. in Statistics, Data Science, Applied Mathematics, Machine Learning, Artificial Intelligence or related fields. Graduates from this track are also highly sought-after by data analysis departments across various industries, including IT, consulting, business, genomics, bioinformatics, medicine, and data-driven research centers.

#### *Mathematics for Biology and Medicine*

The goal of the track is to provide students with the ideal toolbox to design, implement, and apply mathematical and statistical models to problems arising in biology, ecology, epidemiology, molecular networks and medicine. To do so, students will develop solid skills in mathematical modeling, statistics, scientific computing, differential equations, continuum mechanics, and numerical analysis. Unique features of this track are the possibility to do an internship and to interact with clinical research in hospitals, universities, research centers, and companies in Italy and abroad.
The skills acquired in the field of modelling and statistics form a solid basis for a PhD in applied mathematics or biomedical sciences and are also highly valued in companies, especially in the pharmaceutical sector.

#### *Modelling, Statistics and Analysis in Mathematical Finance*

The program in entirely taught in English. Students are required to acquire expertise in both analytical and stochastic modeling, data analysis, machine learning, and programming. Upon completion of the program, as part of thesis preparation, students are offered internships with companies and the opportunity to collaborate on their thesis with international research institutions.

## The *curriculum* Teaching and Scientific Communication

The goal of this curriculum is to cover the knowledge and skills required for teaching mathematics at the secondary school level, as well as for communicating mathematics and science to a broad audience.

### *Prerequisites*

Students are supposed to have a basic knowledge on the following topics and a good comprehension of some of them:

- Algebra (groups and rings, ideals, quotients, isomorphism theorems),
- Geometry (general and algebraic topology, topological and differentiable manifolds, basic projective geometry),
- Physics (mechanics, thermodynamics, electromagnetism),
- Measure Theory (Lebesgue measure and integration theory),
- Ordinary Differential Equations,
- Classical Foundations of Mathematical Physics,
- Probability (including the axiomatic construction) and Statistics.

| Curriculum Advanced Mathematics, *Track General Advanced Mathematics* | | | | | | |
|---|---|---|---|---|---|---|
| Advisor of study: Francesco Serra Cassano | | | | | | |
| **Code** | **Course** | **CFU** | **Hours** | **SSD** | **Sem** | **Lecturer** |
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| **CORE COURSES** | | | | | | |
| ***At least 24 credits in sectors MATH-01/A-MATH-03/A, of which at least 15 in the following table*** | | | | | | |
| 145135 | Computational Algebra | 6 | 42 | MATH-02/A | 1 | Alessandra Bernardi |
| 145130 | Advanced Geometry | 9 | 63 | MATH-02/B | 1 | Roberto Pignatelli |
| 145129 | Advanced Analysis | 9 | 63 | MATH-03/A | 1 | Francesco Serra Cassano |
| ***The remaining credits in the following table:*** | | | | | | |
| 145146 | Mathematical Logic | 6 | 42 | MATH-01/A | 1 | Stefano Baratella |
| 145394 | Coding Theory and Applications | 6 | 42 | MATH-02/A | 1 | Nadir Murru |
| 145393 | Partial Differential Equations (I modulo)<br>Partial Differential Equations (II modulo) | 6<br>3 | 42<br>21 | MATH-03/A | 1<br>1 | Alberto Valli<br>Alessandro Carlotto |
| **At least 15 *credits in sectors MATH-03/B-MATH-05/A from the following table*** | | | | | | |
| 145435 | Stochastic Processes | 9 | 63 | MATH-03/B | 1 | Luigi Amedeo Bianchi<br>Stefano Bonaccorsi |
| 145908 | Mathematical Physics – Differential Geometric Methods | 9 | 63 | MATH-04/A | 1 | Enrico Pagani |
| 145907 | Mathematical Physics – Quantum relativistic Theories | 9 | 63 | MATH-04/A | 2 | Valter Moretti |
| 145152 | Numerical Methods for PDEs | 6 | 48 | MATH-05/A | 2 | Robert Nürnberg |
| **COMPLEMENTARY COURSES – Credits in Core and Complementary courses must be at least 75** | | | | | | |
| **Complementary courses can be chosen in the following table:** | | | | | | |
| 145407 | Model Theory (*) | 6 | 42 | MATH-01/A | 2 | Stefano Baratella |
| 145156 | Set Theory (**) | 6 | 42 | MATH-01/A | 2 | N.A. |
| 145131 | Algebraic Geometry I | 6 | 42 | MATH-02/B | 1 | Alessandro Oneto<br>Edoardo Ballico |
| 145132 | Algebraic Geometry II (**) | 6 | 42 | MATH-02/B | 2 | N.A. |
| 145506 | Algebraic Topology (*) | 6 | 42 | MATH-02/B | 1 | Riccardo Ghiloni |
| 145566 | Real Algebraic Geometry (**) | 6 | 42 | MATH-02/B | 1 | N.A. |
| 145557 | Advanced Calculus of Variations (**) | 6 | 42 | MATH-03/A | 2 | N.A. |
| 145507 | Advanced Topics in Analysis (*) | 6 | 42 | MATH-03/A | 1 | Gian Paolo Leonardi |
| 145434 | Fourier Analysis | 6 | 42 | MATH-03/A | 2 | Marco Bonacini |
| 145538 | Geometric Analysis | 9 | 63 | MATH-03/A | 2 | Lorenzo Mazzieri |
| 145258 | Geometric Measure Theory | 6 | 42 | MATH-03/A | 2 | Andrea Marchese<br>Paolo Bonicatto |
| 145259 | Mathematical control theory (**) | 6 | 42 | MATH-03/A | 1 | N.A. |
| 146115 | Minimal surfaces | 6 | 42 | MATH-03/A | 1 | Alessandro Carlotto |
| 145159 | Stochastic Differential Equations | 6 | 42 | MATH-03/B | 2 | Michele Coghi |
| 146211 | Optimal transport | 6 | 42 | MATH-03/A | 1 | Paolo Bonicatto<br>Andrea Marchese |
| 146212 | Toric Geometry (*) | 6 | 42 | MATH-02/B | 2 | Luis Eduardo Solá Conde<br>Elisa Postinghel |
| 146213 | Dynamical systems (*) | 6 | 42 | MATH-03/A | 1 | Fabio Bagagiolo |
| 146366 | Interactive Theorem Proving | 6 | 42 | INFO-01/A | 2 | Roberto Zunino |
| 146367 | Mathematics for Quantum Fields | 6 | 42 | MATH-04/A | 1 | Romeo Brunetti |
| **FREE CHOICE COURSES** | | | | | | |
| The choice of free courses shall be consistent with the selected curriculum. Students may use 3 of these CFU to take an internship, according to the rules of the Regolamento. | | | | | | |
| **THESIS** | | | | | | |
| The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. Students who opt for a 3 CFU internship as part of their elective courses are required to submit an original thesis worth 30 CFU. | | | | | | |

## Curriculum Advanced Mathematics, *Track Advanced Algebra and Geometry*

Advisors of study: Roberto Pignatelli, Willem Adriaan De Graaf

| Code | Course | CFU | Hours | SSD | Sem | Lecturer |
|---|---|---|---|---|---|---|
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| **CORE COURSES** | | | | | | |
| 145135 | Computational Algebra | 6 | 42 | MATH-02/A | 1 | Alessandra Bernardi |
| 145130 | Advanced Geometry | 9 | 63 | MATH-02/B | 1 | Roberto Pignatelli |
| 145129 | Advanced Analysis | 9 | 63 | MATH-03/A | 1 | Francesco Serra Cassano |
| **At least 15 *credits in sectors MATH-03/B-MATH-05/A from the following table*** | | | | | | |
| 145435 | Stochastic Processes | 9 | 63 | MATH-03/B | 1 | Luigi Amedeo Bianchi<br>Stefano Bonaccorsi |
| 145152 | Numerical Methods for PDEs | 6 | 48 | MATH-05/A | 2 | Robert Nürnberg |
| 145908 | Mathematical Physics – Differential Geometric Methods | 9 | 63 | MATH-04/A | 1 | Enrico Pagani |
| 145907 | Mathematical Physics – Quantum relativistic Theories | 9 | 63 | MATH-04/A | 2 | Valter Moretti |
| **COMPLEMENTARY COURSES** | | | | | | |
| **At least 33 credits chosen in the following table:** | | | | | | |
| 145407 | Model Theory (*) | 6 | 42 | MATH-01/A | 2 | Stefano Baratella |
| 145156 | Set Theory (**) | 6 | 42 | MATH-01/A | 2 | N.A. |
| 146368 | Advanced Algebra (*) | 6 | 42 | MATH-02/A | 1 | Mima Stanojkovski |
| 145953 | Advanced Number Theory (**) | 6 | 42 | MATH-02/A | 2 | N.A. |
| 145131 | Algebraic Geometry I | 6 | 42 | MATH-02/B | 1 | Alessandro Oneto<br>Edoardo Ballico |
| 145132 | Algebraic Geometry II (**) | 6 | 42 | MATH-02/B | 2 | N.A. |
| 145506 | Algebraic Topology (*) | 6 | 42 | MATH-02/B | 1 | Riccardo Ghiloni |
| 145566 | Real Algebraic Geometry (**) | 6 | 42 | MATH-02/B | 1 | N.A. |
| 145538 | Geometric Analysis | 9 | 63 | MATH-03/A | 2 | Lorenzo Mazzieri |
| 146212 | Toric Geometry (*) | 6 | 42 | MATH-02/B | 2 | Luis Eduardo Solá Conde<br>Elisa Postinghel |
| 145146 | Mathematical Logic | 6 | 42 | MATH-01/A | 1 | Stefano Baratella |
| 145394 | Coding Theory and Applications | 6 | 42 | MATH-02/A | 1 | Nadir Murru |

**FREE CHOICE COURSES**

Students in this track are strongly encouraged to select their elective courses from the MATH-02 sector.
They may also choose courses from the Bachelor's degree program, specifically: *Algebra Commutativa*, *Geometria Differenziale*, *Teoria Algebrica dei Numeri*, *Introduzione alla Geometria Algebrica*, and *Teoria di Galois*, provided they have not already taken a similar course during their undergraduate studies.
Up to 3 CFU may be used to carry out an internship, in accordance with the program regulations (*Regolamento*).

**THESIS**

The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. Students who opt for a 3 CFU internship as part of their elective courses are required to submit an original thesis worth 30 CFU.

## Curriculum Advanced Mathematics,
## *Track Calculus of Variations, Partial Differential Equations and Dynamical Systems*

Advisors of study: Gian Paolo Leonardi, Francesco Serra Cassano

| Code | Course | CFU | Hours | SSD | Sem | Lecturer |
|---|---|---|---|---|---|---|
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| **CORE COURSES** | | | | | | |
| 145130 | Advanced Geometry | 9 | 63 | MATH-02/B | 1 | Roberto Pignatelli |
| 145129 | Advanced Analysis | 9 | 63 | MATH-03/A | 1 | Francesco Serra Cassano |
| 145393 | Partial Differential Equations (I modulo)<br>Partial Differential Equations (II modulo) | 6<br>3 | 42<br>21 | MATH-03/A | 1<br>1 | Alberto Valli<br>Alessandro Carlotto |
| 145435 | Stochastic Processes | 9 | 63 | MATH-03/B | 1 | Luigi Amedeo Bianchi<br>Stefano Bonaccorsi |
| 145152 | Numerical Methods for PDEs | 6 | 48 | MATH-05/A | 2 | Robert Nürnberg |
| **COMPLEMENTARY COURSES – 36 credits chosen in the following table:** | | | | | | |
| 145557 | Advanced Calculus of Variations (**) | 6 | 42 | MATH-03/A | 2 | N.A. |
| 145507 | Advanced Topics in Analysis (*) | 6 | 42 | MATH-03/A | 1 | Gian Paolo Leonardi |
| 145142 | Foundations of Analysis (*) | 6 | 42 | MATH-03/A | 2 | Fabio Bagagiolo |
| 145434 | Fourier Analysis | 6 | 42 | MATH-03/A | 2 | Marco Bonacini |
| 145538 | Geometric Analysis | 9 | 63 | MATH-03/A | 2 | Lorenzo Mazzieri |
| 145258 | Geometric Measure Theory | 6 | 42 | MATH-03/A | 2 | Andrea Marchese<br>Paolo Bonicatto |
| 145259 | Mathematical control theory (**) | 6 | 42 | MATH-03/A | 1 | N.A. |
| 146115 | Minimal surfaces | 6 | 42 | MATH-03/A | 1 | Alessandro Carlotto |
| 145159 | Stochastic Differential Equations | 6 | 42 | MATH-03/B | 2 | Michele Coghi |
| 145908 | Mathematical Physics – Differential Geometric Methods | 9 | 63 | MATH-04/A | 1 | Enrico Pagani |
| 145907 | Mathematical Physics – Quantum relativistic Theories | 9 | 63 | MATH-04/A | 2 | Valter Moretti |
| 146211 | Optimal transport | 6 | 42 | MATH-03/A | 1 | Paolo Bonicatto<br>Andrea Marchese |
| 146213 | Dynamical systems (*) | 6 | 42 | MATH-03/A | 1 | Fabio Bagagiolo |

**FREE CHOICE COURSES**

Students in this track are strongly encouraged to select their elective courses from the MATH-03/A sector.
They may also choose courses from the Bachelor's degree program, specifically: *Equazioni Differenziali Ordinarie*, *Calcolo delle Variazioni*, *Analisi Funzionale*, or *Geometria Differenziale*, provided they have not already taken a similar course during their undergraduate studies.
Up to 3 CFU may be used to carry out an internship, in accordance with the program regulations (*Regolamento*).

**THESIS**

The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. Students who opt for a 3 CFU internship as part of their elective courses are required to submit an original thesis worth 30 CFU.

| Curriculum Cryptography, *Track Stage-Oriented* | | | | | | |
|---|---|---|---|---|---|---|
| Advisor of study: Marco Calderini | | | | | | |
| **Code** | **Course** | **CFU** | **Hours** | **SSD** | **Year – Sem** | **Lecturer** |
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – a C1 certificate of English is highly recommended | | | | | | |
| **CORE COURSES** | | | | | | |
| 146369 | Symmetric cryptography and finite fields | 6 | 48 | MATH-02/A | I.1 | Marco Calderini<br>Irene Villa |
| 146370 | Public-key and post-quantum cryptography | 6 | 48 | MATH-02/A | I.2 | Federico Pintore<br>Irene Villa |
| 145394 | Coding Theory and Applications | 6 | 42 | MATH-02/A | I.1 | Nadir Murru |
| 145135 | Computational Algebra | 6 | 42 | MATH-02/A | I.1 | Alessandra Bernardi |
| 145157 | Stochastic Processes (I modulo) | 6 | 42 | MATH-03/B | 1 | Sonia Mazzucchi |
| 145427 | Scientific Computing | 9 | 72 | MATH-05/A | 2 | Robert Nürnberg |
| **COMPLEMENTARY COURSES** | | | | | | |
| ***The following four courses:*** | | | | | | |
| 145508 | Advanced Programming of Cryptographic Methods | 6 | 48 | INFO-01/A | II.1 | Silvio Ranise |
| 145937 | Introduction to computer and network security | 6 | 48 | IINF-05/A | I.1 | Mut DISI (0517H – cod. 145937) |
| 145777 | Applied Cryptography | 6 | 42 | MATH-02/A | I.1 | Marco Calderini<br>Federico Pintore |
| 146266 | Cryptographic Protocols for Secure Networks and Applications | 6 | 42 | IINF-01/A | I.2 | Silvio Ranise |
| ***At least 12 credits in the following table:*** | | | | | | |
| 145451 | Computability and computational complexity | 6 | 48 | MATH-01/A | 1 | Mut DISI (0517H – cod. 145451) |
| 146371 | Advanced Symmetric Cryptography | 6 | 42 | MATH-02/A | 2 | Massimiliano Sala |
| 146372 | Advanced Public-key Cryptography | 6 | 42 | MATH-02/A | II.1 | Massimiliano Sala |
| 145953 | Advanced Number Theory (**) | 6 | 42 | MATH-02/A | 2 | N.A. |
| 145212 | Discrete Fourier Analysis (**) | 6 | 42 | MATH-02/A | 2 | N.A. |
| 145256 | Statistics of Stochastic Processes | 6 | 48 | MATH-03/B | 1 | Claudio Agostinelli |
| 146373 | Quantum information | 6 | 42 | MATH-03/B | 1 | Sonia Mazzucchi |
| 145614 | Multimedia Data Security | 6 | 48 | IINF-03/A | 1 | Mut DISI (0346H – 145614) |
| 145190 | Digital Signal Processing | 6 | 48 | IINF-03/A | 1 | Mut DISI (0346H – cod. 146224 mod. 1) |
| 146318 | Automated Reasoning and Formal Verification | 12 | 96 | IINF-05/A | 2 | Mut DISI (0517H – cod. 146318) |
| 146157 | Blockchain | 6 | 48 | INFO-01/A | 2 | Mut DISI (0517H - cod. 146157) |
| **FREE CHOICE COURSES** | | | | | | |
| To complement their preparation in this track, students who did not take Java programming courses during their Bachelor's studies are strongly encouraged to attend the course *Laboratorio di Programmazione*. Other recommended courses from the Bachelor's program include *Teoria Algebrica dei Numeri* and *Teoria di Galois*. | | | | | | |
| **THESIS** | | | | | | |
| The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. | | | | | | |

| Curriculum Cryptography, *Track Research-Oriented* | | | | | | |
|---|---|---|---|---|---|---|
| Advisor of study: Marco Calderini | | | | | | |
| **Code** | **Course** | **CFU** | **Hours** | **SSD** | **Year – Sem** | **Lecturer** |
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – a C1 certificate of English is highly recommended | | | | | | |
| **CORE COURSES** | | | | | | |
| 146369 | Symmetric cryptography and finite fields | 6 | 48 | MATH-02/A | I.1 | Marco Calderini<br>Irene Villa |
| 146370 | Public-key and post-quantum cryptography | 6 | 48 | MATH-02/A | I.2 | Federico Pintore<br>Irene Villa |
| 145394 | Coding Theory and Applications | 6 | 42 | MATH-02/A | I.1 | Nadir Murru |
| 145135 | Computational Algebra | 6 | 42 | MATH-02/A | I.1 | Alessandra Bernardi |
| ***Students can choose between the following two pairs:*** | | | | | | |
| 145256 | Statistics of Stochastic Processes | 6 | 48 | MATH-03/B | 1 | Claudio Agostinelli |
| 145435 | Stochastic Processes | 9 | 63 | MATH-03/B | 1 | Luigi Amedeo Bianchi<br>Stefano Bonaccorsi |
| ***Or:*** | | | | | | |
| 145157 | Stochastic Processes (I modulo) | 6 | 42 | MATH-03/B | 1 | Sonia Mazzucchi |
| 145907 | Mathematical Physics – Quantum relativistic Theories | 9 | 63 | MATH-04/A | 2 | Valter Moretti |
| **COMPLEMENTARY COURSES** | | | | | | |
| ***The following three courses:*** | | | | | | |
| 146372 | Advanced Public-key Cryptography | 6 | 42 | MATH-02/A | II.1 | Massimiliano Sala |
| 146371 | Advanced Symmetric Cryptography | 6 | 42 | MATH-02/A | 2 | Massimiliano Sala |
| 146373 | Quantum information | 6 | 42 | MATH-03/B | 1 | Sonia Mazzucchi |
| ***At least 18 credits in the following table:*** | | | | | | |
| 146368 | Advanced Algebra (*) | 6 | 42 | MATH-02/A | 1 | Mima Stanojkovski |
| 145953 | Advanced Number Theory (**) | 6 | 42 | MATH-02/A | 2 | N.A. |
| 145131 | Algebraic Geometry I | 6 | 42 | MATH-02/B | 1 | Alessandro Oneto<br>Edoardo Ballico |
| 145777 | Applied Cryptography | 6 | 42 | MATH-02/A | I.1 | Marco Calderini<br>Federico Pintore |
| 145212 | Discrete Fourier Analysis (**) | 6 | 42 | MATH-02/A | 2 | N.A. |
| **FREE CHOICE COURSES** | | | | | | |
| Students in this track are strongly encouraged to choose their elective courses from the MATH-02/A sector. Courses may also be selected from the Bachelor's program; *Algebra Commutativa*, *Teoria Algebrica dei Numeri*, and *Teoria di Galois* are particularly recommended. | | | | | | |
| **THESIS** | | | | | | |
| The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. | | | | | | |

## Curriculum Mathematics and Statistics for Life and Social Sciences, *Track Mathematics for Data Science*

Advisor of study: Veronica Vinciotti

| Code | Course | CFU | Hours | SSD | Year Sem | Lecturer |
|---|---|---|---|---|---|---|
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| **CORE COURSES** | | | | | | |
| 145905 | Geometry and Topology for Data Analysis | 6 | 42 | MATH-02/B | I.2 | Alessandro Oneto |
| 145435 | Stochastic Processes | 9 | 63 | MATH-03/B | 1 | Luigi Amedeo Bianchi<br>Stefano Bonaccorsi |
| 145427 | Scientific Computing | 9 | 72 | MATH-05/A | I.2 | Robert Nürnberg |
| 145256 | Statistics of stochastic processes | 6 | 48 | MATH-03/B | II.1 | Claudio Agostinelli |
| ***One course among the following:*** | | | | | | |
| 145145 | Mathematical Biology | 9 | 72 | MATH-03/A | I.1 | Simone Pezzuto<br>Cinzia Soresina |
| 145538 | Geometric Analysis | 9 | 63 | MATH-03/A | 2 | Lorenzo Mazzieri |
| **COMPLEMENTARY COURSES** | | | | | | |
| 145909 | Tensor Decomposition for Big Data Analysis | 6 | 42 | MATH-02/A | I.1 | Alessandra Bernardi |
| 145902 | Advanced Statistical Methods | 6 | 42 | MATH-03/B | I.2 | Claudio Agostinelli |
| 145561 | Bayesian Statistics | 6 | 42 | MATH-03/B | I.2 | Pier Luigi Novi Inverardi |
| 145914 | Statistical Models | 6 | 42 | MATH-03/B | I.1 | Veronica Vinciotti |
| 146049 | Graphical Models and Network Science | 6 | 42 | MATH-03/B | II.1 | Veronica Vinciotti |
| ***One course among the following:*** | | | | | | |
| 145434 | Fourier Analysis | 6 | 42 | MATH-03/A | II.2 | Marco Bonacini |
| 145159 | Stochastic Differential Equations | 6 | 42 | MATH-03/B | I.2 | Michele Coghi |
| **FREE CHOICE COURSES** | | | | | | |
| Knowledge of probability theory and mathematical statistics is essential. Please check the syllabus of the courses: Calcolo delle probabilita II and Statistica matematica (Bachelor's degree in Italian) to ensure that all the topics are covered at the requested level of depth. Students missing these prerequisites will have to include here the aforementioned courses. | | | | | | |
| 146373 | Quantum information | 6 | 42 | MATH-03/B | 1 | Sonia Mazzucchi |
| 145152 | Numerical Methods for PDEs | 6 | 48 | MATH-05/A | 2 | Robert Nürnberg |
| 146213 | Dynamical systems (*) | 6 | 42 | MATH-03/A | 1 | Fabio Bagagiolo |
| 146214 | Markov Decision Processes and Reinforcement Learning | 6 | 48 | MATH-03/B | 1 | Francesco Giuseppe Cordoni |
| 146211 | Optimal transport | 6 | 42 | MATH-03/A | 1 | Paolo Bonicatto<br>Andrea Marchese |
| 145903 | Deep Learning | 6 | 48 | INFO-01/A | 2 | Mut DISI (0342H – cod.145857 Machine Learning (mod. II)) |
| 145062 | Machine Learning | 6 | 48 | INFO-01/A | 1 | Mut DISI (0517H – cod. 145062) |
| **THESIS** | | | | | | |
| The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. | | | | | | |

## Curriculum Mathematics and Statistics for Life and Social Sciences, *Track Mathematics for Biology and Medicine*

Advisor of study: Simone Pezzuto

| Code | Course | CFU | Hours | SSD | Year Sem | Lecturer |
|---|---|---|---|---|---|---|
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| **CORE COURSES** | | | | | | |
| ***The following five courses*** | | | | | | |
| 145145 | Mathematical Biology | 9 | 72 | MATH-03/A | I.1 | Simone Pezzuto<br>Cinzia Soresina |
| 145139 | Partial Differential Equations | 6 | 42 | MATH-03/A | I.1 | (condivide 6 CFU con l'a.d. 145393 I mod)) Alberto Valli |
| 145914 | Statistical Models | 6 | 42 | MATH-03/B | I.1 | Veronica Vinciotti |
| 145427 | Scientific Computing | 9 | 72 | MATH-05/A | I.2 | Robert Nürnberg |
| 145152 | Numerical Methods for PDEs | 6 | 48 | MATH-05/A | I.2 | Robert Nürnberg |
| **COMPLEMENTARY COURSES** | | | | | | |
| ***At least five courses from the following list:*** | | | | | | |
| 146374 | Spatial Models in Biology and Epidemiology | 6 | 48 | MATH-04/A | I.2 | Cinzia Soresina |
| 145136 | Data Analysis and Exploration | 6 | 48 | INFO-01/A | I.2 | Mario Lauria |
| 145910 | Network Modeling and Simulation | 6 | 48 | INFO-01/A | I.1 / II.1 | Mut QCB (0521H – Mathematical Modeling and Simulation mod. Network Modeling and Simulation a.d. 146089) |
| 146375 | Inverse Problems in Biology and Medicine (**) | 6 | 42 | MATH-05/A | II.1 | N.A. |
| 146376 | Computational Haemodynamics (**) | 6 | 48 | MATH-05/A | II.1 | N.A. |
| 146248 | Cardiac Modelling | 6 | 48 | MATH-05/A | I.2 | Simone Pezzuto |
| 146377 | Theoretical Biomechanics | 6 | 48 | CEAR-01/A | I.1 | Davide Bigoni<br>Luigi Fraccarollo |
| 145561 | Bayesian Statistics | 6 | 42 | MATH-03/B | I.2 | Pier Luigi Novi Inverardi |
| ***At least one of the following:*** | | | | | | |
| 145392 | Physiological flow and transport in porous tissues | 6 | 42 | CEAR-01/B | II.1 | Alberto Bellin |
| 146378 | Applications of Mathematics to Biology and Medicine (**) | 6 | 42 | MATH-05/A | II.1 | N.A. |
| 146049 | Graphical Models and Network Science | 6 | 42 | MATH-03/B | II.1 | Veronica Vinciotti |
| 145157 | Stochastic Processes (I modulo) | 6 | 42 | MATH-03/B | I.1 / II.1 | Sonia Mazzucchi |
| **FREE CHOICE COURSES** | | | | | | |
| Students are suggested to take the free courses among those listed above and not already chosen. For students missing some prerequisites in mathematical analysis or probability theory, it is possible to include here appropriate courses (in Italian) from the Bachelor's degree. | | | | | | |
| 146200 | Digital Epidemiology | 6 | 48 | IINF-05/A | I.2 | Mut. DISI (0346H – cod. 146200) |
| 145903 | Deep Learning | 6 | 48 | INFO-01/A | I.2 | Mut DISI (0342H – cod.145857 Machine Learning (mod. II)) |
| 146379 | Modelling in Biomechanics | 3 | 24 | CEAR-01/A | I.1 | Davide Bigoni<br>Luigi Fraccarollo |
| 145434 | Fourier Analysis | 6 | 42 | MATH-03/A | I.2 | Marco Bonacini |
| 145338 | Bio-Medical Imaging | 6 | 48 | PHYS-06/A | I.2 | Mut. FIS (0518H - cod. 145338) |
| 145259 | Mathematical Control Theory (**) | 6 | 42 | MATH-03/A | I.1 / II.1 | N.A. |
| 146213 | Dynamical systems (*) | 6 | 42 | MATH-03/A | I.1 / II.1 | Fabio Bagagiolo |
| **THESIS** | | | | | | |
| The course of studies is concluded either with the discussion of an original thesis, providing 30 CFU or with an internship/placement, which assigns 12 CFU, followed by an original thesis providing 18 CFU. | | | | | | |

| Curriculum Mathematics and Statistics for Life and Social Sciences, *Track Modelling, Statistics and Analysis in Mathematical Finance* | | | | | | |
|---|---|---|---|---|---|---|
| Advisor of study: Michele Coghi | | | | | | |
| **Code** | **Course** | **CFU** | **Hours** | **SSD** | **Year – Sem** | **Lecturer** |
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| **CORE COURSES** | | | | | | |
| 145139 | Partial Differential Equations | 6 | 42 | MATH-03/A | 1 | (condivide 6 CFU con l'a.d. 145393 I mod)) Alberto Valli |
| 145145 | Mathematical Biology | 9 | 72 | MATH-03/A | I.1 | Simone Pezzuto<br>Cinzia Soresina |
| 145256 | Statistics of Stochastic Processes | 6 | 48 | MATH-03/B | II.1 | Claudio Agostinelli |
| 145435 | Stochastic Processes | 9 | 63 | MATH-03/B | I.1 | Luigi Amedeo Bianchi<br>Stefano Bonaccorsi |
| ***At least one of the following*** | | | | | | |
| 145152 | Numerical Methods for PDEs | 6 | 48 | MATH-05/A | I.2 | Robert Nürnberg |
| 145427 | Scientific Computing | 9 | 72 | MATH-05/A | I.2 | Robert Nürnberg |
| **COMPLEMENTARY COURSES** | | | | | | |
| ***The following two courses*** | | | | | | |
| 145914 | Statistical Models | 6 | 42 | MATH-03/B | I.1 | Veronica Vinciotti |
| 145159 | Stochastic Differential Equations | 6 | 42 | MATH-03/B | I.2 | Michele Coghi |
| ***The remaining CFU among the following*** | | | | | | |
| 145905 | Geometry and Topology for Data Analysis | 6 | 42 | MATH-02/B | I.2 | Alessandro Oneto |
| 145902 | Advanced Statistical Methods | 6 | 42 | MATH-03/B | I.2 | Claudio Agostinelli |
| 145561 | Bayesian Statistics | 6 | 42 | MATH-03/B | I.2 | Pier Luigi Novi Inverardi |
| 146213 | Dynamical systems (*) | 6 | 42 | MATH-03/A | 1 | Fabio Bagagiolo |
| 146214 | Markov Decision Processes and Reinforcement Learning | 6 | 48 | MATH-03/B | 1 | Francesco Giuseppe Cordoni |
| 145991 | Applied Stochastic Processes | 6 | 42 | MATH-03/B | 2 | N.A. |
| 145912 | Scientific Programming | 6 | 48 | INFO-01/A | 1 | Mut QCB (0521H Scientific programming – mod. Programming – cod. 145540) |
| 121395 | Financial markets and economic activity | 6 | 36 | ECON-01/A | 1 | Mut DEM (0119H – cod. 121395) |
| 121469 | Mercati e Intermediari Finanziari Progredito | 10 | 60 | ECON-09/B | 2 | Mut DEM (0122H – cod. 121469) |
| 121470 | Strumenti di Investimento e Derivati | 10 | 60 | ECON-09/B | 1 | Mut DEM (0122H – cod. 121470) |
| 121414 | Workshop on Financial simulation | 6 | 36 | STAT-02/A | 1 | Mut DEM (0122H – cod. 121414) |
| **FREE CHOICE COURSES** | | | | | | |
| Students are suggested to take the free courses among those listed above and not already chosen. For students missing some prerequisites in mathematical analysis or probability theory, it is possible to include here appropriate courses (in Italian) from the Bachelor's degree. | | | | | | |
| **THESIS** | | | | | | |
| The course of studies is concluded either with the discussion of an original thesis, providing 30 CFU or with an internship/placement, which assigns 12 CFU, followed by an original thesis providing 18 CFU. | | | | | | |

## Curriculum Teaching and Scientific Communication

Advisor of study: Luigi Amedeo Bianchi

| Code | Course | CFU | Hours | SSD | Sem | Lecturer |
|---|---|---|---|---|---|---|
| **MANDATORY** | | | | | | |
| Foreign language (3CFU) – See the introduction, point 6 | | | | | | |
| 145151 | Mathematical models for the Physical, Natural and Social Sciences (**Core course**) | 6 | 42 | MATH-03/B | 1 | Luigi Amedeo Bianchi<br>Francesco Cordoni<br>(P60 Modelli matematici per la scuola secondaria di II grado) |
| 145155 | Modern Physics<br>(**Complementary course**) | 12 | 84 | PHYS-06/B | 1+2 | Giovanni Andrea Prodi |
| **OTHER CORE COURSES – At least 30 credits** | | | | | | |
| 145146 | Mathematical Logic | 6 | 42 | MATH-01/A | 1 | Stefano Baratella |
| 145135 | Computational Algebra | 6 | 42 | MATH-02/A | 1 | Alessandra Bernardi |
| 145253 | Foundations of Geometry | 6 | 42 | MATH-02/B | 2 | Marco Andreatta |
| 145904 | Elementary Mathematics from a Higher Viewpoint | 6 | 42 | MATH-01/B | 1 | Elisa Postinghel |
| 145144 | Laboratory of Didactics of Mathematics | 6 | 42 | MATH-01/B | 2 | Docente da definire |
| 145154 | Experimental Mathematics Laboratory at School Level | 6 | 42 | MATH-01/B | 1 | Silvano Delladio (P60 Laboratorio di sviluppo e approfondimento di attività per la didattica della matematica I-II) |
| 145142 | Foundations of Analysis | 6 | 42 | MATH-03/A | 2 | Fabio Bagagiolo |
| **COMPLEMENTARY COURSES – At least one of the two courses** | | | | | | |
| 145153 | Experimental Physics Laboratory at High School Level I | 6 | 56 | PHYS-06/B | 1 | Pasquale Onorato |
| 145215 | Experimental Physics Laboratory at High School Level II | 6 | 56 | PHYS-06/B | 2 | Pasquale Onorato |
| **OTHER COMPLEMENTARY COURSES – At least 12 credits chosen in the following table or among the courses not chosen from the previous tables** | | | | | | |
| 145906 | Laboratory Techniques for Mathematics Teaching | 6 | 56 | MATH-01/B | 1 | Elisabetta Ossanna (P60 Metodi e contenuti per la didattica della matematica I - II) |
| 145914 | Statistical Models | 6 | 42 | MATH-03/B | 1 | Veronica Vinciotti |
| 146366 | Interactive Theorem Proving | 6 | 42 | INFO-01/A | 2 | Roberto Zunino |
| **OTHER COMPLEMENTARY COURSES – At most 6 credits** | | | | | | |
| Students may choose courses in the MATH-, PHYS/, or INFO-01 sectors offered by Master's degree programs at the University of Trento or by the Master's degree program in Mathematics at the University of Verona. | | | | | | |
| **FREE CHOICE COURSES** | | | | | | |
| Students may use 3 of these CFU to take an internship, according to the rules of the Regolamento. | | | | | | |
| **THESIS** | | | | | | |
| The program concludes either with the defense of an original thesis worth 30 CFU, or with an internship/placement worth 12 CFU followed by an original thesis worth 18 CFU. Students who choose a 3 CFU internship as part of their elective courses are required to complete an original thesis worth 30 CFU. | | | | | | |

# Appendix A – Glossary

- Credit = Credito formativo universitario = CFU
- This is the European unit used to measure the value of academic activities such as courses, internships, or theses. One credit corresponds to approximately 7 hours of lectures and a total of 25 hours of student work. A Master's degree requires 120 CFU.
- Sector = Settore scientifico-disciplinare = SSD
  This is a nation-wide classification of University courses, sorted out in various categories. The categories (SSD) for Mathematics are the following:

| **SSD** | | |
|---|---|---|
| MATH-01/A | Logica Matematica | Mathematical Logic |
| MATH-01/B | Matematiche complementari | Didactics and History of Mathematics |
| MATH-02/A | Algebra | Algebra |
| MATH-02/B | Geometria | Geometry |
| MATH-03/A | Analisi matematica | Mathematical Analysis |
| MATH-03/B | Probabilità e statistica matematica | Probability and Mathematical Statistics |
| MATH-04/A | Fisica matematica | Mathematical Physics |
| MATH-05/A | Analisi numerica | Numerical Analysis |

  For other sectors see http://www.miur.it/UserFiles/115.htm
- *Curriculum* (pl. curricula)
- Within the general framework of the Master of Science in Mathematics, students may choose among different curricula: *Advanced Mathematics*, which focuses on in-depth study of advanced mathematical topics; *Teaching and Scientific Communication*, which emphasizes education and science outreach; *Mathematics and Statistics for Life and Social Sciences*; and *Cryptography*. Each curriculum has its own specific rules for course selection.
- *Study plan (Piano di studi)*
- Each student of the Master of Science in Mathematics must specify their course choices in a document with this name. The plan must include a required number of CFU in *caratterizzanti* (Core) courses and in *affini* (Complementary) courses, distributed across the relevant subject sectors.
- *Track* = suggested study plan
  Examples of possible study plans centered on different aspects of mathematical studies.
- *Stage*: the Italian term (actually borrowed from French) for an internship.
- *Semester* (shortened in sem.)
- Teaching is organized into two periods, conventionally referred to as semesters—each lasting approximately 14 weeks, despite the name suggesting six months. The first semester begins in mid-September and ends just before Christmas. The second semester runs from mid-February to the beginning of June
- Corso mutuato = *Mut*
  This is a course which is offered by a different Department or is a proxy for a course held in a different Department.
- N.A. = Not Available
  A course that has been active in previous years, and may well be active again in the future, but is not currently offered.