



UNIVERSITÀ DEGLI STUDI DI TRENTO

Facoltà di Scienze Matematiche,
Fisiche e Naturali

Manifesto del Corso di Laurea Magistrale in Matematica

Approvato nel Consiglio di Facoltà del 20 maggio 2009

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1. “Istituzione e attivazione”

The Faculty of Science promotes the Corso di Laurea Magistrale in Matematica (Master of Science in Mathematics), belonging to the class “LM-40 - Matematica”. The degree is activated starting from the a.y. 2009/10 through the insertion in the Database of the Offerta Formativa.

2. Goals

The Master of Science in Mathematics (“Laurea Magistrale in Matematica”) is aimed at providing an in-depth knowledge and understanding of several areas of advanced Mathematics, and of its relations to other Sciences.

The courses of the Laurea Magistrale in Mathematics are taught in English.

3. Admission requirements

To apply to the Laurea Magistrale in Informatica, a Bachelor degree lasting for three years or longer is required; such degree must provide at least the basic concepts of linear algebra and mathematical analysis.

In this section, the guidelines used to evaluate whether the bachelor degree satisfy these minimum requirements are discussed.

- *Laurea in Matematica (classe “L-35 – Scienze matematiche”)*. Students with such a degree are automatically admitted to the Laurea Magistrale in Matematica..
- *“Lauree affini”*. Students that have taken at least 60 CFU in the *settori* MAT/* while working at one of the bachelor degrees listed in this Manifesto. For the Academic Year this list is empty.
- In all the other cases, a formal application request is required, including the following information:
 - a detailed study plan of the Bachelor degree, including title and syllabus of all the courses;
 - a document issued from the University that issued the Bachelor degree reporting, in Italian or English, the list of courses, the score obtained in each of them and the final score associated to the degree;
 - work and professional experiences;
 - level of knowledge of English Language, certified by internationally recognized organizations or by the University that issued the Bachelor degree;
 - a motivation statement, explaining why the student is willing to apply to the Corso di Laurea Magistrale in Matematica, and what he/she expect from it.
- These students must submit a personalized study plan.

Applications will be evaluated by a committee indicated by the Consiglio d'Area Didattica in Matematica. The committee can require a personal interview (possibly on-line) with the applicants, to better evaluate their curriculum.

Norma transitoria: gli studenti attualmente iscritti al Corso di Laurea Specialistica in Matematica (classe 45/S) dell'Università di Trento possono richiedere il passaggio al nuovo ordinamento, con riconoscimento totale dei crediti già acquisiti.

4. “Percorsi”and “Orientamenti”

The course is organized into “percorsi”and “orientamenti”.

4.1 Percorso “Mathematical Sciences”

Orientamento di ampia formazione culturale/Higher Mathematics

Compulsory:

Course Title	CFU	Settore	Type	sem
Advanced Analysis	9	MAT/05	Caratterizzante	1
Advanced Geometry	9	MAT/03	Caratterizzante	1
Computational Algebra	6	MAT/02	Caratterizzante	1
Stochastic Processes (primo modulo)	6	MAT/06	Caratterizzante	2
Numerical methods for PDE	6	MAT/08	Caratterizzante	2
Mathematical Physics	9	MAT/07	Affine	2
Stochastic Processes (secondo modulo)	3	MAT/06	Affine	2
CFU Total	48			

Furthermore:

Type	CFU
Affini	24
Free-choice	15
Language Skills	3
Internship	12
Thesis	18
CFU Total	72

Orientamento di Matematica delle Comunicazioni Digitali / Mathematics of Digital Communications

An introduction to advanced algebraic and geometric methods in cryptography and coding theory.

Compulsory

Course Title	CFU	Settore	Type	sem
Computational Algebra	6	MAT/02	Caratterizzante	1
Coding Theory	12	MAT/02	Caratterizzante	1
Integral Transforms	6	MAT/05	Caratterizzante	1
Stochastic Processes (primo modulo)	6	MAT/06	Caratterizzante	2
Statistics of Stochastic Processes	6	MAT/06	Caratterizzante	tace
CFU Total	36			

36 CFU to be chosen among the following:

Course Title	CFU	Settore	Type	sem
Discrete Fourier Analysis	6	MAT/02	Affine	tace
Elliptic Curves and Cryptography	6	MAT/03	Affine	1
Finite Fields and Symmetric Cryptography	6	MAT/02	Affine	2
Communication systems	12	ING-INF/03	Affine	mut
Digital signal processing	6	ING-INF/03	Affine	mut
Multimedia signal processing and communication	6	ING-INF/03	Affine	mut
Data hiding	6	ING-INF/03	Affine	mut

“Comunicazioni elettriche is recommended as a prerequisite to “Communication systems”.

Furthermore:

Type	CFU
Free-choice	15
Language Skills	3
Internship	12
Thesis	18
CFU Total	48

Orientamento di Matematica per l'Economia e la Finanza / Mathematics for Economy and Finance

Compulsory:

Course Title	CFU	Settore	Type	sem
Advanced Analysis	9	MAT/05	Caratterizzante	1
Integral Transforms	6	MAT/05	Caratterizzante	1
Mathematical Biology	9	MAT/05	Caratterizzante	1
Stochastic Processes (primo modulo)	6	MAT/06	Caratterizzante	2
Statistics of Stochastic Processes	6	MAT/06	Affine	tace
Data analysis and exploration	6	MAT/06	Affine	2
Stochastic Differential Equations	6	MAT/06	Caratterizzante	1
Mathematical Finance I	6	SECS-S/06	Affine	2
Mathematical Finance II	6	SECS-S/06	Affine	tace
Numerical Methods for Finance	6	MAT/08	Affine	tace
Economics	6	SECS-P/01	Affine	tace
CFU Total	72			

Furthermore:

Type	CFU
Free-choice	15
Language Skills	3
Internship	12
Thesis	18
CFU Total	48

The following course is strongly recommended:

Stochastic Processes (secondo modulo)	3	MAT/06	Affine
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Orientamento di Matematica per la Biologia / Mathematics for Biology

Compulsory

Course Title	CFU	Settore	Type	sem
Advanced Analysis	9	MAT/05	Caratterizzante	1
Integral Transforms	6	MAT/05	Caratterizzante	1
Stochastic Differential Equations	6	MAT/06	Caratterizzante	1
Mathematical Biology	9	MAT/05	Caratterizzante	2
Stochastic Processes (primo modulo)	6	MAT/06	Caratterizzante	2
CFU Total	36			

36 CFU to be chosen among the following:

Course Title	CFU	Settore	Type	sem
Biology	12	BIO/13	Affine	1
Data mining for biological data	6	ING-INF/05	Affine	1
Machine learning	6	INF/01	Affine	1
Simulation of biological systems	6	INF/01	Affine	2
Data analysis and exploration	6	MAT/06	Affine	2
Advanced topics in biomathematics	6	MAT/05	Affine	tace
Statistics of Stochastic Processes	6	MAT/06	Affine	tace

Furthermore:

Type	CFU
Free-choice	15
Language Skills	3
Internship	12
Thesis	18
CFU Total	45

4.2 Percorso :“Teaching and Scientific Communication”

Compulsory:

Course Title	CFU	Settore	Type	Sem
Didactics of Mathematics	6	MAT/03	Caratterizzante	2
Elementary Mathematics from a higher Viewpoint I	6	MAT/04	Caratterizzante	1
Elementary Mathematics from a higher Viewpoint II	6	MAT/04	Caratterizzante	2
Laboratory of Didactics of Mathematics	6	MAT/04	Caratterizzante	1
Foundations of Analysis	6	MAT/05	Caratterizzante	1
Mathematical models for the Physical, Natural and Social Sciences	6	MAT/06	Caratterizzante	tace
CFU Total	36			

Course Title	CFU	Settore	Type	Sem
Experimental Mathematics Laboratory at High School Level	6	MAT/04	Affine	2
Experimental Physics Laboratory at High School Level (I modulo)	12	FIS/08	Affine	2
Modern Physics	12	FIS/08	Affine	1
Didactics of Computer Science	6	INF/01	Affine	tace
CFU Total	36			

Recommended:

Course Title	CFU	Settore	Sem
Comunicazione delle scienze	6	MAT/04	2
CFU Total	6		

Moreover:

Type	CFU
Free-choice	15
Language Skills	3
Internship	12
Thesis	18
CFU Total	48

4.3 Free-choice courses

Students can select free-choice courses from one the following possibilities:

- Courses listed in this manifesto, including appendix B below.
- Course offered for the Bachelor Degree (Laurea Triennale) or the Laurea Specialistica in Mathematics, not already taken earlier.
- Course offered by the Faculty of Science and the Faculty of Engineering of the University of Trento, in the *settori* MAT/*, FIS/*, BIO/*, CHIM/*, ING-INF/*, ING/.*
- Courses offered by the Doctoral School in Mathematics of the University of Trento. (The CFU value of such courses has to be evaluated by the relevant committee of CAM.)

Students can select any other course offered at the University of Trento. In this case, however, they have to submit a “piano di studi” containing a detailed motivation for their choices. The plan is subject to approval by the relevant committee of CAM.

5. “Piani di studio liberi”

Students may submit their own “piano di studio libero” (personalized study plan), that is, a course selection which does not fit the scheme above, but which respects the general rules set out in the “Regolamento”. Such a “piano” has to be sponsored by a member of staff sitting in the “Consiglio di Area matematica”. Such “piani” will be examined by a committee, selected by the “Consiglio di Area matematica”.

Allegato A: Docenti di cui all'art. 1, comma 9 dei D.M. 16 marzo 2007

Course Title	Teacher	Settore	CFU
Advanced Analysis	Francesco Serra Cassano	MAT/05	9
Advanced Geometry	Roberto Pignatelli	MAT/03	9
Computational Algebra	Willem de Graaf	MAT/02	6
Stochastic Processes (primo modulo)	Luciano Tubaro	MAT/06	6
Numerical Methods of PDE	Vincenzo Casulli	MAT/08	6
Mathematical Biology	Andrea Pugliese	MAT/02	9
Stochastic Differential Equations	Stefano Bonaccorsi	MAT/06	6
MEDUPVS1	Lucia Beretta	MAT/04	6
Laboratorio di didattica della matematica	Silvano Delladio	MAT/04	6

Allegato B: List of offered courses

Course	Teacher	settore	CFU	Sem
Algebraic Geometry I	Occhetta	MAT/03	6	1
Algebraic Geometry II	Occhetta	MAT/03	6	2
Comunicazione delle Scienze	Tamanini	MAT/04	2	2
Differential Geometric Aspects in Mathematical Physics	Pagani	MAT/07	6	1
Mathematical Foundations of Quantum Mechanics	Brunetti	MAT/07	6	2
Mathematical Logic	Baratella	MAT/01	6	1
Partial Differential Equations	Visintin	MAT/05	6	2
Set Theory	Baratella	MAT/01	6	2
Topology for Science	Ghiloni	MAT/03	6	2