UNIVERSITA' DEGLI STUDI DI MILANO
PROGRAMME DESCRIPTION - ACADEMIC YEAR 2021/22
BACHELOR
Mathematics (Classe L-35)
Enrolled from 2018/2019 a.y.

HEADING

Degree classification - Denomination and code:	L-35 Mathematics
Degree title:	Dottore
Curricula currently available:	General / Applications
Length of course:	3 years
Total number of credits required to complete programme:	180
Years of course currently available:	1st , 2nd , 3rd
Access procedures:	Open, subject to completion of self-assessment test prior to enrolment
Course code:	F7X

PERSONS/ROLES

Head of Study Programme

Prof. Lovadina Carlo

Tutors - Faculty

Tutor per orientamento:
ALZATI Alberto, BIANCHI Mariagrazia, BRESSAN Nicoletta, CALANCHI Marta, CAMPI Luciano, CAVATERRA Cecilia, CIRAOLO Giulio, FUHRMAN Marco, GARBAGNATI Alice, GORI Anna, MAGGIS Marco, MASTROLIA Paolo, MATESSI Diego, MOLTENI Giuseppe, MONTOLI Andrea, MORALE Daniela, PAYNE Kevin, PENATI Tiziano, PIZZOCCHERO Livio, RIZZO Ottavio, SCACCHI Simone, STELLARI Paolo, TARSI Cristina, TASIN Luca, TERRANEO Elide, TORTORA Alfonso, TURRINI Cristina, UGOLINI Stefania, VEESER Andreas, VESELY Libor, VIGNATI Marco, ZAMPIERI Elena, ZANCO Clemente.

Degree Course website

https://matematica.cdl.unimi.it/it

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Secretary of the course of study

via Cesare Saldini 50 Phone 0250316107 09.30-11.30 Email: segrccd.mat@unimi.it

CHARACTERISTICS OF DEGREE PROGRAMME

General and specific learning objectives

The main objectives of the Degree Program in Mathematics are to furnish a solid foundation in the mathematical sciences, to introduce the modern formulation of the discipline, to encourage an active contact with various aspects of the field (including theoretical rigor and attention to applications), and to provide the preparation necessary to comprehend future developments in the field.

Expected learning outcomes

The main competences developed by the graduates in mathematics are, according to the Dublin system of descriptors, the following:

A-KNOWLEDGE AND ABILITY TO UNDERSTAND:
Graduates in mathematics,
-They know and know how to use differential and integral calculus in one and more variables and linear algebra;
-have solid bases of mathematical physics, probability and statistic calculation, numerical analysis, differential and algebraic-projective geometry;
-They know and understand the basic applications of mathematics to both natural and economic and social sciences;
-have adequate computational and computer skills;
-they are able to read mathematical texts and research articles in mathematics.

B-APPLICATION CAPACITY:
Graduates in Mathematics:
-are able to solve problems in different fields of mathematics;
-they are able to mathematically formalise different problems, and to use mathematical methods for their study;
-are able to use qualitative and quantitative methods for data analyses;
-they are able to use computer and computational tools.

C-AUTONOMY OF JUDGEMENT:
Graduates in Mathematics:
-are able to construct and develop logical arguments with a clear identification of assumptions and conclusions;
-are able to recognise correct demonstrations and identify misleading reasoning;
-are able to propose and analyse some mathematical models, associated with concrete situations of interest for the natural and socio-economic sciences or deriving from other disciplines and to use these models to facilitate the study of the original situation;
-They have team work experience and they also know how to work independently.

D-COMMUNICATION SKILLS:
Graduates in Mathematics:
-are able to communicate, both in written and oral form, ideas and mathematical methods;
-they are able to communicate with experts from other sectors, recognizing the possibility of mathematically formalizing problems of different types.

E-ABILITY TO LEARN:
Graduates in Mathematics:
-they are able to continue their studies, both in mathematics and in other disciplines, with a good degree of autonomy;
-they have a flexible mentality and are able to readily fit into the workplace, adapting easily to new problems.

Professional profile and employment opportunities

The Degree in Mathematics enables employment in both the public and private sectors for positions which require capacity for abstract reasoning, formulation and/or modelling of concrete problems and their solution though the use of tools coming from the mathematical sciences.
Recipients of the Degree in Mathematics find careers in: banks, insurance companies, polling and survey institutes, consulting and accrediting firms, software development companies, medical, biomedical and pharmacological institutes and companies, in the green economy, and in research and development divisions of large corporations, and specific industries such as transportation, telecommunication, and aerospace.
A significant portion of degree recipients in Mathematics continue their studies by enrolling in a Masters Degree Program.

Notes

In order to get their degree, students are required to certify their knowledge of the English language at the B1 level. This level can be certified in one of the following ways:
* by submitting their language certificate, taken no more than 3 years before its submittal and attesting a B1 o higher level (for the list of the language certificates which are accepted by the University of Milan, please refer to the website: https://www.unimi.it/en/node/297/).
Students can submit their language certificate during the immatriculation procedure or send it to the Language Centre of the

University of Milan (SLAM) via the Infostudente service.
* by sitting the placement test run by SLAM, during the first year exclusively, from September to December. Should they not pass the Placement Test, students will have to attend the English language course organized by SLAM. All students who do not have a valid language certificate must sit the Placement Test. Those students who do not sit the Placement test by December or do not pass the end of course test in one of the 6 attempts granted will have to get a language certificate outside the University of Milan within their degree.

EXPERIENCE OF STUDY ABROAD AS PART OF THE TRAINING PROGRAM

The University of Milan supports international mobility by providing its students with the opportunity to spend study and internship periods abroad. It is a unique chance to enrich your educational path in a new exciting environment.

The agreements entered into by the University with over 300 universities from the 27 EU member countries and other Extra-EU countries under the European Erasmus+ programme allow regularly enrolled students to carry out part of their studies at one of the partner universities or to undertake internships at companies, training and research centres and other organizations.

Similar international mobility opportunities are provided outside Europe, through agreements with a number of prestigious institutions.

Study and internships abroad

The Bachelor of Science in Mathematics has long been committed to characterize its educational activities in an international framework under the Erasmus program. We activated several agreements with other universities in Europe. In particular, we have exchange agreements within the disciplines of both curricula: with Austria, Britain, Spain, Portugal, France, Germany, Holland, Denmark, Polonia, Slovenia, Sweden, Norway and Finland.

See the website http://users.unimi.it/erasmusmat/ for collected information on locations and how to recognize the activities carried out abroad.

How to participate in Erasmus mobility programs

How to participate in Erasmus+ mobility programmes

The students of the University of Milan can participate in mobility programmes, through a public selection procedure.
Ad hoc commissions will evaluate:
• Academic career
• the candidate's proposed study programme abroad
• his/her foreign language proficiency
• the reasons behind his/her application

Call for applications and informative meetings
The public selection generally begins around February each year with the publication of a call for applications specifying the destinations, with the respective programme duration (from 2/3 to 12 months), requirements and online application deadline.

Every year, before the deadline for the call, the University organizes informative meetings to illustrate opportunities and rules for participation to students.

Erasmus+ scholarship
The European Union grants the winners of the Erasmus+ programme selection a scholarship to contribute to their mobility costs, which is supplemented by the University funding for disadvantaged students.

Language courses
Students who pass the selections for mobility programmes can benefit from intensive foreign language courses offered each year by the University.

Learn more at https://www.unimi.it/en/international/study-abroad/studying-abroad-erasmus

For assistance, please contact:
International Mobility Office
Via Santa Sofia 9 (second floor)
Tel. 02 503 13501-12589-13495-13502
Contacts: InformaStudenti mobility.out@unimi.it
Student Desk booking through InformaStudenti

1st COURSE YEAR Core/compulsory courses/activities common to all curricula

Learning activity		Ects	Sector
Algebra 1		9	MAT/02
Elements of Basic Mathematics		3	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
General Physics 1		9	FIS/08, FIS/07, FIS/06, FIS/05, FIS/04, FIS/03, FIS/02, FIS/01
Geometry 1		6	MAT/03
Geometry 2		9	MAT/03
Mathematical Analysis 1		9	MAT/05
Mathematical Analysis 2		6	MAT/05
Programming 1		6	INF/01
	Total compulsory credits	57	

2nd COURSE YEAR Core/compulsory courses/activities common to all curricula

Learning activity		Ects	Sector
Algebra 2		6	MAT/02
Geometry 3		6	MAT/03
Mathematical Analysis 3		9	MAT/05
Mathematical Analysis 4		6	MAT/05
Mathematical Physics 1		6	MAT/07
Numerical Analysis 1		9	MAT/08
Probability		9	MAT/06
	Total compulsory credits	51	

3rd COURSE YEAR Core/compulsory courses/activities common to all curricula

Learning activity		Ects	Sector
General Physics 2		9	FIS/08, FIS/07, FIS/06, FIS/05, FIS/04, FIS/03, FIS/02, FIS/01
Mathematical Physics 2		6	MAT/07
	Total compulsory credits	15	

Elective courses common to all curricula

In the second and third year of the course the student must acquire 18 credits free of choice.
The following table shows the teachings specifically activated by CDM. The student can also freely choose among all the teachings activated by the university, and in particular among those activated by the CDM in mathematics for a curriculum different from that followed by the student (it is noted that the course of Geometry 4 (first part) is Available only for students of the application curriculum) and among those of the magistral in mathematics.
With regard to the courses of analysis it is advisable to follow real analysis and/or complex analysis.
The choice is subject to the approval of the CDM.
It is noted that the teaching of mathematical methods and models for applications is incompatible with the activity of mathematical methods and models for applications (which is one of the activities of choice for obtaining F-type credits) and, similarly, The teaching of scientific calculation is incompatible with the activity of scientific calculation.

Algebra 4	6	MAT/02
Geometry 5	6	MAT/03
Introduction to Image Processing	6	(3) MAT/03, (3) MAT/08
Mathematical methods and models for applications	6	MAT/07
Numerical Linear Algebra	6	MAT/08
Programming 2	6	INF/01
Scientific Computing	6	MAT/08

COURSE YEAR UNDEFINED Core/compulsory courses/activities common to all curricula

Learning activity		Ects	Sector
English assessment B1 (3 ECTS)		3	ND
	Total compulsory credits	3	

Further elective courses common to all curricula

The student must obtain 9 credits by choosing a course from the following:

	9	INF/01
General Physics 3	9	FIS/08, FIS/07, FIS/06, FIS/05, FIS/04, FIS/03, FIS/02, FIS/01

End of course requirements common to all curricula

Final Exam		3	NA
	Total compulsory credits	3	

ACTIVE CURRICULA LIST

General Course years currently available: 1°, 2°, 3°
Applications Course years currently available: 1°, 2°, 3°

Procedure for choosing a curriculum

Student chooses the curriculum during the second year.

CURRICULUM: [F7X-A] General

Qualifying Training Objectives

Curriculum A, General.

It is the specific objective of the curriculum to provide in-depth knowledge in the different fields of mathematics. It is foreseen a significant share of formative activities characterized by a particular logical rigor and a high level of abstraction.

It is possible to foresee stays at other European universities, also within the framework of international agreements.

It is possible to foresee, in relation to specific objectives, the carrying out of external activities, for example training courses in public administration structures

2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features General			
Learning activity		**Ects**	**Sector**
Geometry 4		9	MAT/03
	Total compulsory credits	9	
3rd COURSE YEAR Elective courses Curriculum-specific elective courses for General			
The student must obtain 9 credits with a course of choice among the following:			
Algebra 3		9	MAT/02
Mathematical Physics 3		9	MAT/07
Further elective courses Curriculum-specific features General			
The student must obtain 6 credits with one or more of the following F-type activities:			
Educational Training		3	NA
Elements of Basic Mathematics 2		3	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
Essay Written under the Direction of a Staff Member		3	NA
Laboratory of Mathematical Statistics		3	MAT/06
Mathematical Methods and Models for the Applications		6	MAT/07
Topics in Scientific Computing		6	MAT/08

CURRICULUM: [F7X-B] Applications

Qualifying Training Objectives

Curriculum B, Application.

It is the specific objective of this curriculum to provide in-depth knowledge of computational aspects of mathematics, statistics and finance. An important share of formative activities is foreseen, characterised by a particular attention to the modelling of natural, social and economic phenomena, and of technological problems.

It is possible to foresee stays at other European universities, also within the framework of international agreements.

It is possible to foresee, in relation to specific objectives, the carrying out of external activities, for example training courses at companies, public administration structures and laboratories.

2nd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Applications			
Learning activity		**Ects**	**Sector**
Numerical Analysis 2		9	MAT/08
	Total compulsory credits	9	
3rd COURSE YEAR Core/compulsory courses/activities Curriculum-specific features Applications			
Learning activity		**Ects**	**Sector**
Laboratory of Mathematical Statistics		3	MAT/06
Mathematical Statistics		9	MAT/06
	Total compulsory credits	12	
Further elective courses Curriculum-specific features Applications			
The student must obtain 3 credits with one or more of the following F-type activities.			
Educational Training		3	NA

Elements of Basic Mathematics 2	3	MAT/09, MAT/01, MAT/02, MAT/03, MAT/04, MAT/05, MAT/06, MAT/07, MAT/08
Essay Written under the Direction of a Staff Member	3	NA
Internship in Industry	3	NA

COURSE PROGRESSION REQUIREMENTS

For the students who matriculated from the Academic Year 2019/2020 on, passing the exam of the course "Elementi di Matematica di Base" is mandatory for the exams of all the courses of the second and the third year. This rule applies to all the Curricula. Furthermore, the students should take into account the teachers' suggestions regarding possible preliminary useful courses.