

Mathematics and Applications

UNICAM, in its effort to counter gender stereotypes, has undertaken awareness-raising initiatives to give greater linguistic visibility to differences. When the masculine form is used in this text for the sole purpose of simplification, it is intended to be inclusive of all individuals operating within the university community.

Master's Degree Postgraduate Degree

Duration: 2 years
Credits: 120 ECTS
Campus location: Camerino

web

<https://www.mat.unicam.it>

fb

Unicam - Sezione di Matematica

Matematica a Camerino

instagram

[unicam_matematica](#)

School of Science and Technology

Mathematics Division

Camerino - via Madonna delle Carceri 9

Director

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Dott. Anna Maria Santroni

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Course Coordinator

Prof. Sonia L'Innocente

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Delegates

Educational guidance

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International mobility

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Study plan and course-choice guidance

Prof. Lorella Fatone

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OVERVIEW

The Master in Mathematics and Applications

- strengthens knowledge of pure mathematics
- offers three different curricula - one on pure mathematics and mathematics education, a second on applications of mathematics to economics and finance, and a third on applications to technology and engineering
- gives students the option to acquire valuable work experience through internships in businesses or schools.

This Master's course benefits from the longstanding and widely appreciated educational expertise of its faculty members, notoriously very friendly with their students, and from a wide range of supporting facilities such as communal study spaces, computer services, libraries, as well as dedicated tutoring services. The research experience of faculty members feeds directly into the curriculum, which includes topics related to, for example, the design of electric and racing cars, applications to earth and sea sciences, economics and finance, health (medical diagnostics), assistive robotics (exoskeletons), and much more.

ADMISSION REQUIREMENTS

Bachelor's degree in mathematics, or in other disciplines as long as including at least 30 ECTS in mathematics and adequate knowledge of algebra, analysis and geometry.

Further information on admission requirements, pre-admission deadlines, and services for international students is available at <http://international.unicam.it>

CAREER OPPORTUNITIES

- Italian-speaking students interested in teaching may consider a school internship - please contact Prof. Sonia L'Innocente (sonia.linnocente@unicam.it) for further information.
- Students interested in a career in industry (for example involving the development and application of mathematical models for finance, commerce or industry), or in the civil service, are encouraged to visit www.unicam.it/master or to contact directly Prof. Pierluigi Maponi (pierluigi.maponi@unicam.it) or Prof. Carlo Lucheroni (carlo.lucheroni@unicam.it)
- Students interested in academic research are advised to consider the PhD programmes of the UNICAM International School of Advanced Studies - see <http://isas.unicam.it> for further information.

Lectures are held face-to-face on campus. Remote attendance may be made available through the UNICAM streaming platform, depending on university policy.

The format of laboratory activities may vary - relevant details are made available as necessary.

All teaching is in English.



COURSE STRUCTURE

Three curricula are available: Pure Mathematics, Mathematics for Industrial Engineering, and Mathematics for Analytics and Finance.

The academic year is divided into two semesters, the first from mid-September to the end of January, and the second from early March to mid-June.

The exams periods are the full months of February, June and July, and September.



Pure Mathematics

96 ECTS - mandatory:	ECTS
Advanced Algebra and Mathematical Logic (1 st year)	12
Advanced Geometry (1 st year)	12
Advanced Mathematical Analysis (1 st year)	6
Calculus of Variations (1 st year)	6
Advanced Applied Mathematics (1 st year)	12
Advanced Probability (1 st year)	6
Free-choice courses	12
Dissertation (see below)	30

12 ECTS among the following courses:	ECTS
Knot Theory (2 nd year)	6
Educational Mathematics (2 nd year)	6
History of Mathematics (2 nd year)	6
Revisiting Calculus (2 nd year)	6
General Relativity (2 nd year)	6

12 ECTS among the following courses:	ECTS
Inverse Problems in Remote Sensing Applications (2 nd year)	6
Quantum Computation (2 nd year)	6
Theoretical Physics (2 nd year)	6
Computability and Complexity (2 nd year)	6
Advanced Mathematical Physics (2 nd year)	6
Stochastic Processes (2 nd year)	6
Applied Topology (2 nd year)	6
Embedded Systems Lab for Industry and Education (2 nd year)	6

Optional courses

Free choice credits can include

- additional courses in mathematics
- courses in physics, computer science and other subjects
- language courses (advanced English or other languages)
- seminars on mathematics and its applications (in Italian)
- higher-level apprenticeships (see below).

Students with an undergraduate degree in a subject other than mathematics are advised to use the free-choice ECTS to acquire the necessary background in mathematics. Moreover, they are warmly invited to contact the Course Coordinator to discuss available options.

High Apprenticeship

This is a one-year, on-the-job training programme. To this end, students may use the ECTS reserved for

- optional courses, or
- the final dissertation.

Knowledge of the Italian language is strongly recommended.

For information and in order to define a suitable study plan, please contact pierluigi.maponi@unicam.it or carlo.lucheroni@unicam.it well in advance.

Mathematics for Industrial Engineering

102 ECTS - mandatory:	ECTS
Advanced Algebra (1 st year)	6
Advanced Geometry I (1 st year)	6
Advanced Mathematical Analysis (1 st year)	6
Advanced Applied Mathematics (1 st year)	12
Advanced Probability and Stochastic Process (1 st year)	12
Systems Analysis and Control Theory (1 year)	12
Embedded Systems Lab for Industry and Education (1 st year)	6
Free-choice courses	12
Dissertation (see below)	30

6 ECTS among the following courses:	ECTS
Machine Learning (2 nd year)	6
Advanced Mathematical Physics (2 nd year)	6

6 ECTS among the following courses:	ECTS
Knot Theory (2 nd year)	6
Inverse Problems in Remote Sensing Applications (2 nd year)	6
Calculus of Variations (2 nd year)	6

6 ECTS among the following courses:	ECTS
General Relativity (2 nd year)	6
Advanced Mechanical Design (2 nd year)	6
Advanced Geometry II (2 nd year)	6
Computational Graphics and Data Visualization (2 nd year)	6
Nonlinear Control Theory (2 nd year)	6
Dynamic and Stochastic Optimization in Finance and Economics (2 nd year)	6
Advanced Statistics (2 nd year)	6
Fundamentals of Materials Science (2 nd year)	6
Polymer Chemistry and Applications (2 nd year)	6

* Courses in blue are interdisciplinary and in collaboration with other departments

Mathematics for Analytics and Finance

102 ECTS - mandatory:	ECTS
Advanced Algebra (1 st year)	6
Advanced Topology (1 st year)	6
Advanced Mathematical Analysis (1 st year)	6
Advanced Applied Mathematics (1 st year)	12
Advanced Probability and Stochastic Processes (1 st year)	12
Machine Learning (2 nd year)	6
Computational Methods for Finance (1 st year)	6
Dynamic and Stochastic Optimization in Finance and Economics (2 nd year)	6
Free-choice courses	12
Dissertation (see below)	30

18 ECTS among the following courses:	ECTS
Advanced Statistics (1 st year)	6
Embedded Systems Lab for Industry and Education (1 st year)	6
Calculus of Variations (1 st year)	6
Computational Graphics and Data Visualization (1 st year)	6
Nonlinear Control Theory (1 st year)	6
Parallel and Distributed Programming (1 st year)	6
Financial Management and Strategy (1 year)	6
Blockchain and Distributed Ledger Technologies (1 st year)	6

* Courses in blue are interdisciplinary and in collaboration with other departments

Dissertation

All students are required to submit a final dissertation, written under the supervision of a faculty member. Students must discuss potential dissertation topics with their chosen advisor well in advance of their expected graduation date.

QUALITY ASSURANCE SYSTEM UNICAM

The Quality Management System Certificate ISO 9001:2015 (from AFAQ-France, a French company which is one of the first and most important certification bodies at the global level) guarantees the quality of services provided as part of the course. This certificate is obtained through a rigorous analysis of our internal organizational procedures by AFAQ-France. In this way, any weaknesses or shortcomings are promptly addressed, whether detected by staff or reported by the students themselves. The Quality Management System includes the following support services for students: advice and guidance, mentoring, international mobility, internships, and communication. These services complement educational activities in an ideal way so as to ensure that students develop a broad range of academic and professional skills.

Student Services

Guidance

Orientation to master's degrees

<https://www.unicam.it/futuro-studente/vuoi-iscriverti/orientamento>

Scholarships

- *WelcomeInUnicam*

scholarships for master's degrees

- *TalentInUnicam*

merit scholarships

<https://www.unicam.it/studente/servizi-studenti/borse-di-studio>

Internships and Placements

Internships, Career service, Career day

<https://www.unicam.it/impresa-e-territorio/stage-e-placement>

Welcome and International mobility

welcoming international students, mobility programmes

<https://international.unicam.it/>



Information

Open

Monday-Wednesday-Friday

10.30-13.00

Tuesday-Thursday

15.00-17.00

Address

Polo degli Studenti - via Gentile III da Varano - 62032 Camerino

Contributions and registrations

Procedure available at <https://miiscrivo.unicam.it> from 1 July 2023.

Personalized fees on the basis of the ISEE-U.

Total or partial tuition fees exemptions.

More information

<https://www.unicam.it/didattica/guida-dello-studente>

<https://international.unicam.it/>

International students

Pre-enrolment procedures and requirements

welcom@unicam.it

Student Registry

segreteriastudenti.scienze@unicam.it

Bachelor's Degree and Master's Degree Programmes

<https://www.unicam.it/offerta-formativa>

<https://www.unicam.it/offerta-formativa-en>

<https://www.unicam.it/>

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