UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Master's degree in Advanced Mathematics and Mathematical Engineering (MAMME)

The **master's degree in Advanced Mathematics and Mathematical Engineering (MAMME)** (**master's degree website**) is a master's programme in mathematics offered at the School of Mathematics and Statistics (FME).

The courses offered in MAMME allow our students to design their curriculum with two different orientations: a pure mathematics curriculum (oriented to research in fundamental mathematics) or an applied mathematics curriculum (preparing them for applied mathematics research and for interdisciplinary teamwork, in collaboration with engineers, physicists, biologists, economists, etc.).

The curriculum comprises a total of 60 ECTS credits, divided into 45 credits for courses and 15 for the master's thesis. It is intended to be completed in one academic year. In addition, MAMME offers the possibility of enrolling for up to 22.5 ECTS credits in other master's degrees in mathematics or statistics, or in other UPC master's programmes, opening the path for an interdisciplinary curriculum based on selected courses in master's degrees in engineering and applied sciences. See the MAMME focus proposals at http://mamme.masters.upc.edu/en.

GENERAL DETAILS

Duration and start date
One academic year, 60 ECTS credits. Starting September and February

Timetable and delivery
Afternoons. Face-to-face

Fees and grants
Approximate fees for the master's degree, excluding other costs, €1,660 (€4,150 for non-EU residents).
More information about fees and payment options
More information about grants and loans

Language of instruction
English

Information on language use in the classroom and students' language rights.

Location

School of Mathematics and Statistics (FME)

Official degree
Recorded in the Ministry of Education's degree register

ADMISSION

General requirements
Academic requirements for admission to master's degrees

Specific requirements

This master's degree is aimed at students with good Abstract reasoning, an interest in problem solving, strong work habits and a liking for mathematics.

A scientific background is required, with basic mathematical foundations. For this reason, a bachelor's degree in mathematics, statistics, physics, engineering, economics or science is recommended. This list is non-exhaustive, and all applications will be reviewed on an individual basis.

Admission criteria

The following elements will be taken into consideration during the evaluation process: the academic record, the CV, a statement of purpose and, if deemed necessary, a personal interview and recommendation letters.

Places

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Pre-enrolment

Pre-enrolment closed (consult the new pre-enrolment periods in the academic calendar).

How to pre-enrol

Enrolment

How to enrol

Legalisation of foreign documents

All documents issued in non-EU countries must be legalised and bear the corresponding apostille.

DOUBLE-DEGREE AGREEMENTS

Double-degree pathways with universities around the world

- Master's degree in Advanced Mathematics and Mathematical Engineering (FME) + Master of Science in Applied Mathematics (Illinois Institute of Technology (ITT), Chicago, USA). (Only FME students to Illinois, not vice versa.)
- Master's degree in Advanced Mathematics and Mathematical Engineering (FME) + Master of Science in Industrial and Applied Mathematics (MSIAM) (Institute d'Ingénerie et de Management, Université Grenoble Alpes (UGA), Grenoble, France)

PROFESSIONAL OPPORTUNITIES

Professional opportunities

Some of the career prospects of master's degree graduates are academic research (by pursuing a PhD in mathematics, science or engineering, for instance), mathematical modelling in industry, finance, statistics and applied research (biomedical research centres, computer vision, etc.).

Competencies

Generic competencies

Generic competencies are the skills that graduates acquire regardless of the specific course or field of study. The generic competencies established by the UPC are capacity for innovation and entrepreneurship, sustainability and social commitment, knowledge of a foreign language (preferably English), teamwork and proper use of information resources.

Specific competencies

On completing this master's degree, students will be able to:

1. (Research). Read and understand advanced mathematical papers. Use mathematical research techniques to produce and transmit new results.
2. (Modelling). Formulate, analyse and validate mathematical models of practical problems by using the appropriate mathematical tools.
3. (Calculus). Obtain (exact or approximate) solutions for these models with the available resources, including computational means.
4. (Critical assessment). Discuss the validity, scope and relevance of these solutions; present results and

defend conclusions.

     5. (Teaching). Teach mathematics at university level.

ORGANISATION: ACADEMIC CALENDAR AND REGULATIONS

UPC school

    School of Mathematics and Statistics (FME)

Academic coordinator

    Jordi Saludes Closa

Academic calendar

    General academic calendar for bachelor's, master's and doctoral degrees courses

Academic regulations

    Academic regulations for master's degree courses at the UPC

CURRICULUM

Subjects	ECTS credits	Type
FIRST SEMESTER		
Commutative Algebra	7.5	Optional
Discrete and Algorithmic Geometry	7.5	Optional
Graph Theory	7.5	Optional
Mathematical Modelling with Partial Differential Equations	7.5	Optional
Mathematical Models in Biology	7.5	Optional
Non-Commutative Algebra	7.5	Optional
Number Theory	7.5	Optional
Numerical Methods for Dynamical Systems	7.5	Optional
Numerical Methods for Partial Differential Equations	7.5	Optional
Quantitative and Qualitative Methods in Dynamical Systems	7.5	Optional
SECOND SEMESTER		
Advanced Course in Partial Differential Equations	7.5	Optional
Algebraic Geometry	7.5	Optional
Codes and Cryptography	7.5	Optional
Combinatorics	7.5	Optional
Computational Mechanics	7.5	Optional
Differentiable Manifolds	7.5	Optional
Hamiltonian Systems	7.5	Optional
Machine Learning	7.5	Optional
Seminar on Algebra, Geometry and Discrete Mathematics	3	Optional
Seminar on Analysis, Differential Equations and Modelling	3	Optional
Master's Thesis	15	Project