

# MASTER'S DEGREE IN ADVANCED MATHEMATICS AND MATHEMATICAL ENGINEERING

**FME**

School of Mathematics and Statistics



UNIVERSITAT POLITÈCNICA  
DE CATALUNYA  
BARCELONATECH

*International Campus of Excellence*

# MASTER’S DEGREE IN ADVANCED MATHEMATICS AND MATHEMATICAL ENGINEERING

The master’s degree in Advanced Mathematics and Mathematical Engineering (MAMME) has a dual academic and professional orientation. On the academic side, it provides the skills and techniques needed for scientific research in general and, more specifically, for mathematical research. On the professional side, it enables students to enter any interdisciplinary team alongside, engineers, physicists, biologists and economists, for example.

The master’s degree is organised by the School of Mathematics and Statistics (FME), a school belonging to the Universitat Politècnica de Catalunya · BarcelonaTech (UPC).

## Curriculum

This information may be subject to change.  
Up-to-date information is available at [upc.edu](http://upc.edu)

60 ECTS  
credits

The courses offered on the MAMME allow our students to design their curriculum, with one of two orientations:

- \* a pure mathematics curriculum, oriented to research in fundamental mathematics, or
- \* an applied mathematics curriculum, which prepares them for research in applied mathematics and work in interdisciplinary teams with engineers, physicists, biologists, economists, etc.

More precisely, students on the MAMME can choose from five different specialisations: Algebra and Geometry, Discrete Mathematics and Algorithmics, Modelling in Engineering and Biomedical Sciences, Differential Equations and Scientific Computing

1st semester		2nd semester
45 ECTS credits		15 ECTS credits
≥22.5 ECTS credits in the MAMME	≤22.5 ECTS credits in the MAMME or other master’s programmes	Master’s thesis

1st

technical university in Spain  
in Mathematics

Source: Shanghai Ranking’s Global Ranking of Academic Subjects 2019

91%

of master’s degree graduates  
in Physics and Mathematics  
are in employment

Source: 2nd graduate employment survey  
of master’s degree graduates of Catalan universities  
(AQU Catalunya, 2017)

>50%

international students

### Requirements

The master’s degree is intended for students with good abstract reasoning skills, an interest in problem solving, strong work habits and a liking for mathematics.

A scientific background in mathematics is required. For this reason, a bachelor’s degree in Mathematics, Statistics, Physics or Engineering is recommended, although this list is not exclusive and all applications are reviewed on an individual basis.

### Admission criteria

The following are taken into consideration in the admission process: academic record, curriculum vitae, statement of purpose and, if necessary, a personal interview.

### Structure

The MAMME is a one-year master’s degree that is divided into two semesters.

The language of instruction is English and face-to-face classes are taught in the afternoon, so that it is easier for students to combine their professional work with their studies.

Regarding the curriculum options, students can take courses (up to 22.5 ECTS credits) from other master’s programmes, such as the following:

- Master’s degree in Advanced Mathematics of the Universitat de Barcelona (UB)
  - Master’s degree in Statistics and Operations Research (UPC-UB)
  - Other master’s degrees at the UPC
- Courses from other STEM master’s degrees can also be taken, subject

to the approval of the MAMME coordinator and the coordinator of the second master’s degree.

### Excellence in research

Professors of the MAMME have been recognised for their research excellence (ERC grants, ICREA Academia, etc.)

### Master’s thesis

All students are required to write and defend a master’s thesis in the second semester. The master’s thesis can be oriented towards research. You will have the option to carry it out at a department, a laboratory, a research group of the School, another university or a company, or within the framework of a mobility programme.

### Double degrees

The FME offers a double master’s degree with the Illinois Institute of Technology (IIT), USA. Students who complete the double degree, which lasts one and a half years, are awarded the MAMME by the FME and a master’s degree in Applied Mathematics by IIT. Applications must be submitted before 1 November in the first semester of the master’s degree. Students also have the option to carry out their master’s theses at IIT under the supervision of one of the Institute’s lecturers.

### Work placement

Students enrolled in the master’s degree can gain work experience at a company, although this is not part of the curriculum.

### Professional opportunities

Graduates may find employment in academic research (by pursuing a doctoral degree, mathematical modelling in industry, finance, statistics, biomedics, computer vision or other fields).

### Mobility programmes

The master’s degree promotes the mobility of its students through agreements with other universities in Europe, Latin America and the rest of the world, within the framework of international mobility programmes such as Erasmus+ and UPC Europe. Needless to say, students from other universities are welcome.

### International recognition

The FME has been ranked 76th–100th worldwide, 32nd–45th in Europe and 1st–3rd in Spain (ShanghaiRanking Global Ranking of Academic Subjects 2019), and 67th worldwide, 21st in Europe and 1st in Spain (National Taiwan University Ranking 2018). The master’s degree is the natural continuation of the FME’s bachelor’s degree in Mathematics, which is the first bachelor’s degree in mathematics in most national rankings and has been recognised as excellent by AQU Catalunya.

### Access to doctoral studies

The master’s degree gives access to the doctoral degree in Applied Mathematics and provides a solid background to any doctoral degree in science or engineering.

# MASTER'S DEGREE IN ADVANCED MATHEMATICS AND MATHEMATICAL ENGINEERING

The School of Mathematics and Statistics (FME), created in 1992, has been a leader and pioneer in double degrees in mathematics and engineering since 1998. Its excellent degrees in mathematics and statistics welcome the best students from Spain and abroad. The FME is strongly committed to research and knowledge transfer to businesses. Research and technology transfer are basic activities for promoting the quality of the School's degrees, providing job opportunities and making a contribution to society.

The FME is a school of the Universitat Politècnica de Catalunya · BarcelonaTech (UPC), a benchmark public institution of research and higher education in the fields of engineering, architecture, science and technology. With 50 years of history and more than 30,000 students, the UPC has the greatest concentration of research and innovation in southern Europe. The UPC is the top Catalan university in Mathematics in the 2019 ShanghaiRanking Global Ranking of Academic Subjects and QS World University Rankings by Subject.

*f<sub>M<sub>e</sub></sub>* Mathematics is everywhere



More information:  
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