

Master in Mathematics and applications

Master in Science in Industrial and Applied Mathematics (MSIAM)

Presentation

Currently, applied mathematics is an area that provides many job opportunities, in industry and in the academic world. There is a great demand for mathematical engineers on topics such as scientific computation, big data analysis, imaging and computer graphics, with applications in many fields such as physics, medicine, biology, engineering, finance, environmental sciences.

The master of Science in industrial and applied mathematics (MSIAM) offers a large spectrum of courses, covering areas where the research in applied math in Grenoble is at the best level. The graduates are trained to become experts and leaders in scientific and technological projects where mathematical modeling and computing issues are central, in industry or research. A large and distinguished graduate Faculty participate in the program, bringing their expertise in a wide range of areas of mathematics including applied analysis, numerical analysis and scientific computing, probability theory and statistics, computational graphics, image analysis and processing, and applied geometry.

The academic program is a two-year master program (120 ECTS), fully taught in English. It combines three semesters of courses and laboratory work (90 ECTS) with a six-month individual research project (30 ECTS). The first year is composed of a common core which provides theoretical and practical grounds in probability and statistics, PDE and modelling, images and geometry as well as computer sciences, optimisation and cryptology. In the second year, the third semester is divided in 2 tracks :

- Modeling, Scientific Computing and Image analysis (MSCI)
- Data Science (DS)

The semester 10 is devoted to the master thesis project.

Registration and scholarships

To be admitted to the program, candidates must have previously completed their undergraduate studies and been awarded a bachelor degree in Mathematics or Applied mathematics, or equivalent. MSIAM is a two-years master degree. Students can apply to master 1st year or directly to second year.

- Admission in 1st year : Anyone holding a 3rd year licence or bachelor degree in Mathematics or Applied mathematics or an equivalent degree, interested in pursuing a high level mathematical education and motivated by the applications of mathematics. The minimum requirement is to have earned at least the equivalent of 180 ECTS credits
- Admission in 2nd year : Anyone holding a first year of master (60 ECTS credits) in mathematics or applied mathematics or an equivalent degree, interested in pursuing a high level mathematical education and motivated by the applications of mathematics. The minimum requirement is to have earned at least the equivalent of 240 ECTS credits

Important notes:

- Students from related backgrounds (physics, computer science, engineering...) may also apply provided they possess outstanding mathematical qualifications and are highly motivated by applications
- Eligibility : only individuals who have an excellent academic record will be considered. Applications from students from traditionally underrepresented groups are particularly encouraged.
- Academic standing : Fellows must maintain full-time status in the master's program, and must be engaged in full-time coursework or research during the academic year (september 1st - July 31st)

Public continuing education : You are in charge of continuing education :

- if you resume your studies after 2 years of interruption of studies
- or if you followed a formation under the regime formation continues one of the 2 preceding years
- or if you are an employee, job seeker, self-employed

If you do not have the diploma required to integrate the training, you can undertake a [validation of personal and professional achievements \(VAPP\)](#)

Would you like to apply and register ? Please note that the procedure differs depending on the degree, the diploma obtained, or the place of residence for foreign students.

- **You are a non-EU citizen, resident in (*you live in one of these countries*) :**

Algeria, Argentina, Benin, Brazil, Burkina Faso, Cameroon, Chile, China, Colombia, Comoros, Congo, Egypt, Indonesia, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mexico, Morocco, Peru, Russia, Senegal, South Korea, Syria, Taiwan, Togo, Tunisia, Turkey, Vietnam.

[Apply for studies in France and on FSA](#)

For other applicants : [Apply Now](#)

Practicals informations :

- > **School :** Grenoble INP, UFR IM2AG (informatique, mathématiques et mathématiques appliquées)
- > **Duration :** 2 years
- > **Course type :** Initial and Continuing Education
- > **Location(s) :** Grenoble - University campus
- > **Contacts :**

Programme director

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Program

Master Industrial and applied math 1st year

Semester 7

UE Partial differential equations and numerical methods	6 ECTS	54h
UE Signal and image processing	6 ECTS	54h
UE Geometric modelling	6 ECTS	54h
1 option (s) to choose from 2		
UE French as a foreign language		
UE English		

Semester 8

UE Computing science for big data and HPC	6 ECTS	54h
UE Project	3 ECTS	
UE Internship	3 ECTS	
UE Numerical optimisation	6 ECTS	54h
2 option (s) to choose from 4		
UE Computer algebra and cryptology	6 ECTS	30h
UE Variational methods applied to modelling	6 ECTS	54h
UE 3D Graphics	3 ECTS	36h
UE Operations research	3 ECTS	36h

Master MSIAM-Modeling, Scientific Computing and Image analysis (MSCI) 2nd year

Semester 9

10 option (s) to choose from 12		
UE Advanced imaging	3 ECTS	18h
UE An introduction to shape and topology optimization	3 ECTS	18h
UE Congestion Phenomena and Compressibility for Granular Media	3 ECTS	18h
UE Efficient methods in optimization	3 ECTS	18h
UE Geophysical imaging	3 ECTS	18h
UE GPU Computing	3 ECTS	18h

UE Level set methods and optimization algorithms with applications in imaging	3 ECTS	18h
UE Model exploration for approximation of complex, high-dimensional problems	3 ECTS	18h
UE Modeling seminar and projects	6 ECTS	60h
UE Numerical optimal transport and geometry	3 ECTS	18h
UE Software development tools and methods	3 ECTS	39h
UE Wavelets and applications	3 ECTS	18h

Semester 10

UE MA research project	30 ECTS	
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Master MSIAM-Data science 2nd year

Semester 9

10 option (s) to choose from 21		
UE Advanced algorithms for machine learning and data mining	3 ECTS	18h
UE An introduction to shape and topology optimization	3 ECTS	18h
UE Computational biology	3 ECTS	18h
UE Data science seminar	3 ECTS	18h
UE Efficient methods in optimization	3 ECTS	18h
UE Fundamentals of probabilistic data mining	3 ECTS	18h
UE Geophysical imaging	3 ECTS	18h
UE GPU Computing	3 ECTS	18h
UE Information access and retrieval	3 ECTS	18h
UE Introduction to extreme-value analysis	3 ECTS	18h
UE Kernel methods for machine learning	3 ECTS	18h
UE Machine Learning for Computer Vision and Audio Processing	3 ECTS	18h
UE Machine learning fundamentals	3 ECTS	30h
UE Model exploration for approximation of complex, high-dimensional problems	3 ECTS	18h

UE Model selection for large-scale learning	3 ECTS	18h
UE Modeling seminar and projects	6 ECTS	60h
UE Numerical optimal transport and geometry	3 ECTS	18h
UE Software development tools and methods	3 ECTS	39h
UE Statistical methods for forecasting	3 ECTS	18h
UE Stochastic calculus and applications to finance	3 ECTS	18h
UE Wavelets and applications	3 ECTS	18h

Semester 10

UE MA research project	30 ECTS
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