SCIENCES, TECHNOLOGIES AND HEALTH

Master in Science in Industrial and Applied Mathematics (MSIAM)

Master in Mathematics and applications

Duration
2 years

Component
Grenoble INP, Institut d'ingénierie et de management - UGA, UFR IM2AG (informatique, mathématiques et mathématiques appliquées)

Language(s) of instruction
English, French

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.

International education : Internationally-oriented programmes

International dimension

The training is entirely in English and is open to an international audience.

Admission

Access conditions

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)

Candidature / Application

Do you want to apply and register? Note that the procedure differs depending on the degree considered, the degree obtained, or the place of residence for foreign students.

Find out which procedure applies to me and apply

Prerequisites

Language requirements :

- Students from countries where English language is not the primary language are required to provide evidence of competence in English. The requirement is waived for applicants from English speaking countries as well as applicants whose previous degree is from a program taught in English. English scores required : TOEFL IBT 100 min / TOEIC 750 min / IELTS 6.5 min. This is equivalent to the CEFR CEFR level B2, although we will consider applicants with a B1 level and who have an excellent academic record
- An A2 level in French is recommended

And after

Professional integration statistics

In the 2014-2015 survey, 9 respondent graduates were in the labour market (employment+research). Of these, 100% were employed 30 months after graduation.

Useful info

Contacts

Program director

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Course location(s) - City

Grenoble

Campus

Grenoble - University campus

Program

Master Industrial and applied math 1st year

Semester 7

	Nature	CM	TD	TP	Crédits
UE Objected-oriented and software design	Teaching Unit (UE)			18h	3 credits
UE Applied probability and statistics	Teaching Unit (UE)	24h		24h	6 credits
UE Partial differential equations and numerical methods	Teaching Unit (UE)	18h	18h	18h	6 credits
UE Signal and image processing	Teaching Unit (UE)		4,5h	16,5h	6 credits
UE Geometric modelling	Teaching Unit (UE)	16,5h	4,5h	33h	6 credits
UE French as a foreign language	Teaching Unit (UE)				
UE English	Teaching Unit (UE)				

Semester 8

	Nature	CM	TD	TP	Crédits
UE Computing science for big data and HPC	Teaching Unit (UE)			18h	6 credits
UE Project	Teaching Unit (UE)				3 credits
UE Internship	Teaching Unit (UE)				3 credits
UE Numerical optimisation	Teaching Unit (UE)			18h	6 credits
UE Computer algebra and cryptology	Teaching Unit (UE)			15h	6 credits
UE Variational methods applied to modelling	Teaching Unit (UE)	18h	18h	18h	6 credits

UE 3D Graphics	Teaching Unit (UE)	18h	18h		3 credits
UE 3D Graphics Complementary	Teaching Unit (UE)				3 credits
UE Operations research	Teaching Unit (UE)	15h	18h	3h	3 credits
UE Operations Research Complementary	Teaching Unit (UE)	18h			3 credits
UE Statistical analysis and document mining	Teaching Unit (UE)	16,5h	7,5h	9h	6 credits

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

Semester 9

	Nature	CM	TD	TP	Crédits
UE Advanced imaging	UE	18h			3 credits
UE An introduction to shape and topology optimization	UE	18h			3 credits
UE Congestion Phenomena and Compressibility for Granular Media	UE	18h			3 credits
UE Efficient methods in optimization	UE	18h			3 credits
UE Geophysical imaging	UE	18h			3 credits
UE GPU Computing	UE	9h		9h	3 credits
UE Level set methods and optimization algorithms with applications in imaging	UE	18h			3 credits
UE Model exploration for approximation of complex, high-dimensional problems	UE	18h			3 credits
UE Modeling seminar and projects	UE		36h	24h	6 credits
UE Numerical optimal transport and geometry	UE	18h			3 credits
UE Software development tools and methods	UE	9h		30h	3 credits
UE Wavelets and applications	UE	18h			3 credits

Semester 10

	Nature	CM	TD	TP	Crédits
UE MA research project	UE				30 credits

Master MSIAM-Data science 2nd year

Semester 9

	Nature	CM	TD	TP	Crédits
UE Advanced algorithms for machine learning and data mining	UE	18h			3 credits
UE An introduction to shape and topology optimization	UE	18h			3 credits
UE Computational biology	UE	18h			3 credits
UE Data science seminar	UE	18h			3 credits
UE Efficient methods in optimization	UE	18h			3 credits
UE Fundamentals of probalistic data mining	UE	13,5h		4,5h	3 credits
UE Geophysical imaging	UE	18h			3 credits
UE GPU Computing	UE	9h		9h	3 credits
UE Information access and retrieval	UE	18h			3 credits
UE Introduction to extreme-value analysis	UE	18h			3 credits
UE Kernel methods for machine learning	UE	18h			3 credits
UE Machine Learning for Computer Vision and Audio Processing	UE	18h			3 credits
UE Machine learning fundamentals	UE	18h		12h	3 credits
UE Model exploration for approximation of complex, high-dimensional problems	UE	18h			3 credits
UE Model selection for large-scale learning	UE	18h			3 credits
UE Modeling seminar and projects	UE		36h	24h	6 credits
UE Numerical optimal transport and geometry	UE	18h			3 credits
UE Software development tools and methods	UE	9h		30h	3 credits
UE Statistical methods for forecasting	UE	18h			3 credits
UE Stochastic calculus and applications to finance	UE	18h			3 credits
UE Wavelets and applications	UE	18h			3 credits

Semester 10

	Nature	CM	TD	TP	Crédits
UE MA research project	UE				30 credits