

# Master of Science in Informatics at Grenoble (MoSIG)

Master in Computer science



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

The training covers a wide spectrum at the level of the first year master's trains graduates with a general education and foundation solid in computer science (in terms of programming languages, databases, networks, software engineering, object-oriented design/programming, complexity, and interactive software) ; the second year of the master's allows students to acquire organizational skills related to research work and to become specialized in a field of computer science in connection with the numerous options offered (Information systems and advanced software engineering, Human-centred computer science - design of highly reliable embedded and cyberphysical systems, artificial Intelligence and web - graphics, vision, and robotics, interactive and ubiquitous systems, and embedded, parallel, and distributed systems). The objective is to give the necessary foundations for a job in research and development as well as to undertake a thesis in Computer science in the fields covered by academic and industrial laboratories.

The aim of the course is to carry out high-level training in computer science for teaching, research, engineering, and development.

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## Skills

The teaching units of semester 8 (first year of master's) are for the most part introductions to the different specialties of the second year of the master's. In this sense, they constitute training for research. The second year master's allows students to acquire organizational skills and skills related to researcher work

- Formulate a research problem and propose a solution
- Locate a research problem in the scientific literature
- Evaluate and validate a solution to a research problem
- Write a scientific publication
- Communicating the results of research work
- Develop and use mathematical and computer tools
- Communicate in English and French
- Become a specialist in a field of computer science related to computer research on the site: information systems and advanced software engineering - human-centred computer science - foundations of Computer science : design and validation - artificial intelligence and web - graphics,

vision and robotics - interactive and ubiquitous systems -  
embedded, parallel and distributed systems

**International education** : Internationally-oriented  
programmes

## Organisation

**Abroad internship** : In France or abroad

## Admission

### Access conditions

The first year of master's degree is accessible on file (and /  
or interview) to candidates with a national diploma conferring  
the degree of license in a field compatible with that of the  
master or via a validation of studies or acquired according to  
the conditions determined by the university or training. The  
second year master's is accessible to candidates according  
to their transcripts (and/or interview) :

- Having validated the first year of a compatible course
- Or by validating studies or acquired experience according  
to the conditions determined by the university or the  
training.

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

## Fees

Tuition fees 2019-2020 : 243 €

## And after

### Further studies

Ph.D.

## Professional integration statistics

During the 2014-2015 survey, 2 graduates are in the labor  
market (job + research). Of these, 100% are employed 30  
months after graduation.

## Sector(s)

Research and higher education, research and development

## Useful info

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## Contacts

### Program director

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### Program director

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## Course location(s) - City

📍 Grenoble

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## Campus

🏠 Grenoble - University campus

# Program

## Master MoSIG 1st year

### Semester 7

	Nature	CM	TD	TP	Crédits
UE Programming language and compiler design	Teaching Unit (UE)	33h	33h		6 credits
UE Software engineering	Teaching Unit (UE)				3 credits
UE Principles of operating systems	Teaching Unit (UE)	33h	33h		6 credits
UE Algorithms and program design	Teaching Unit (UE)				3 credits
UE Mathematics for computer science	Teaching Unit (UE)				3 credits
UE Introduction to visual computing	Teaching Unit (UE)	15h	18h		3 credits
UE Technical writing and speaking	Teaching Unit (UE)		27h		3 credits
UE Programming project (OS)	Teaching Unit (UE)				3 credits
UE Programming project (Compiler design)	Teaching Unit (UE)				3 credits

### Semester 8

	Nature	CM	TD	TP	Crédits
UE Research project (TER)	Teaching Unit (UE)				3 credits
UE Research methodology	Teaching Unit (UE)	3h	4,5h		3 credits
UE Introduction to modeling and verification of digital systems	Teaching Unit (UE)	15h		15h	3 credits
UE Operations research	Teaching Unit (UE)	15h	18h	3h	3 credits

UE Data base foundations	Teaching Unit (UE)	19,5h	12h	4,5h	3 credits
UE Introduction to distributed systems	Teaching Unit (UE)	15h		18h	3 credits
UE Human computer interaction	Teaching Unit (UE)	18h	18h		3 credits
UE Intelligent systems: reasoning and recognition	Teaching Unit (UE)	36h			3 credits
UE Computer networks principles	Teaching Unit (UE)	24h		12h	3 credits
UE 3D graphics	Teaching Unit (UE)		18h		3 credits
UE Robotics and IoT	Teaching Unit (UE)	6h		21h	3 credits
UE Introduction to cryptology	Teaching Unit (UE)	16,5h	9h	10,5h	3 credits
UE Parallel algorithms and programming	Teaching Unit (UE)	15h	6h	12h	3 credits
UE Fundamental computer science	UE	15h	15h		3 credits

## Master MoSIG-AISSE 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
UE Architecture : components and services	Teaching Unit (UE)	13,5h	4,5h		3 credits
UE Model driven engineering	Teaching Unit (UE)	18h			3 credits
UE Process engineering	Teaching Unit (UE)	18h			3 credits
UE Verification and test theories	Teaching Unit (UE)	18h			3 credits
UE Data management in large-scale distributed systems	Teaching Unit (UE)	18h			3 credits
UE Temporal and spatial informations	Teaching Unit (UE)	18h			3 credits

UE Software mining and re-engineering	Teaching Unit (UE)	18h			3 credits
UE Information access and retrieval	Teaching Unit (UE)	18h			3 credits
UE Engineering human-computer interaction	Teaching Unit (UE)	36h			6 credits
UE Scientific methodology and performance evaluation	Teaching Unit (UE)	18h			3 credits

## Semester 10

	Nature	CM	TD	TP	Crédits
UE Research project	Teaching Unit (UE)				30 credits

## Master MoSIG-AIW 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
UE Knowledge representation and reasoning	Teaching Unit (UE)	36h			6 credits
UE Semantic Web : from XML to OWL	Teaching Unit (UE)	36h			6 credits
UE Machine learning fundamentals	Teaching Unit (UE)	18h			3 credits
UE Advanced algorithms for machine learning and data mining	Teaching Unit (UE)	18h			3 credits
UE Information access and retrieval	Teaching Unit (UE)	18h			3 credits
UE Natural language and speech processing	Teaching Unit (UE)	18h			3 credits
UE Multi-agent systems	Teaching Unit (UE)	18h			3 credits
UE Information visualization	Teaching Unit (UE)	18h			3 credits

### Semester 10

	Nature	CM	TD	TP	Crédits
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UE Research project

Teaching  
Unit (UE)

30 credits

## Master MoSIG-GVR 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
UE Computer graphics II	Teaching Unit (UE)	36h			6 credits
UE Autonomous robotics	Teaching Unit (UE)	36h			6 credits
UE Computer vision	Teaching Unit (UE)	36h			6 credits
UE Medical imaging, simulation and robotics	Teaching Unit (UE)	12h	6h		3 credits
UE Computational geometry	Teaching Unit (UE)	18h			3 credits
UE Human-centered interaction	Teaching Unit (UE)	36h			6 credits
UE Scientific methodology and performance evaluation	Teaching Unit (UE)	18h			3 credits
UE Machine learning fundamentals	Teaching Unit (UE)	18h			3 credits
UE Machine Learning for Computer Vision and Audio Processing	Teaching Unit (UE)	18h			3 credits
UE Numerical optimal transport and geometry	UE	18h			3 credits

### Semester 10

	Nature	CM	TD	TP	Crédits
UE Research project	Teaching Unit (UE)				30 credits

## Master MoSIG-DI 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
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UE Advanced aspects of operating systems	Teaching Unit (UE)	36h			3 credits
UE Advanced data networks	UE	36h			6 credits
UE Software infrastructure of data centers and Cloud computing	UE	18h			3 credits
UE Scientific methodology and performance evaluation	Teaching Unit (UE)	18h			3 credits
UE Wireless networks	Teaching Unit (UE)	18h			3 credits
UE Distributed system	Teaching Unit (UE)	18h			3 credits
UE Security architecture : network, system, key management, cybersecurity of industrial IT	Teaching Unit (UE)	42h	15h	21h	6 credits

## Semester 10

	Nature	CM	TD	TP	Crédits
UE Research project	Teaching Unit (UE)				30 credits

## Master MoSIG-HECS 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
UE Verification and test theories	Teaching Unit (UE)	18h			3 credits
UE Models and languages for model checking	UE	18h			3 credits
UE SAT / SMT solving	UE	6h	6h	6h	3 credits
UE Analysis and verification of sequential programs	Teaching Unit (UE)	12h	12h	12h	6 credits
UE Requirements engineering	Teaching Unit (UE)	18h			3 credits
UE Industrial processes for high-confidence design	Teaching Unit (UE)	18h		18h	6 credits
UE Advanced algorithms for machine learning and data mining	Teaching Unit (UE)	18h			3 credits
UE Probabilistics, timed and hybrid systems	UE	18h			3 credits



## Semester 10

	Nature	CM	TD	TP	Crédits
UE Research project	Teaching Unit (UE)				30 credits

## Master MoSIG-UIS 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
UE Human-centered interaction	Teaching Unit (UE)	36h			6 credits
UE Engineering human-computer interaction	Teaching Unit (UE)	36h			6 credits
UE Information visualization	Teaching Unit (UE)	18h			3 credits
UE Computer vision	Teaching Unit (UE)	36h			6 credits
UE Machine learning fundamentals	Teaching Unit (UE)	18h			3 credits
UE Scientific methodology and performance evaluation	Teaching Unit (UE)	18h			3 credits

### Semester 10

	Nature	CM	TD	TP	Crédits
UE Research project	Teaching Unit (UE)				30 credits

## Master MoSIG-Data Sciences 2nd year

### Semester 9

	Nature	CM	TD	TP	Crédits
UE Data management in large-scale distributed systems	Teaching Unit (UE)	18h			3 credits
UE Convex and distributed optimization	Teaching Unit (UE)	18h			3 credits
UE High performance computing for mathematical models	Teaching Unit (UE)	9h			3 credits

UE Fundamentals of probabilistic data mining	Teaching Unit (UE)	18h			3 credits
UE Machine learning fundamentals	Teaching Unit (UE)	18h			3 credits
UE Advanced algorithms for machine learning and data mining	Teaching Unit (UE)	18h			3 credits
UE Distributed system	Teaching Unit (UE)	18h			3 credits
UE Information visualization	Teaching Unit (UE)	18h			3 credits
UE Information access and retrieval	Teaching Unit (UE)	18h			3 credits
UE Machine Learning for Computer Vision and Audio Processing	Teaching Unit (UE)	18h			3 credits
UE Data challenges	Teaching Unit (UE)		18h		3 credits
UE Model selection for large-scale learning	UE	15h		3h	3 credits
UE Computational biology	Teaching Unit (UE)	18h			3 credits
UE Data science seminar	UE	18h			3 credits
UE Numerical optimal transport and geometry	UE	18h			3 credits

## Semester 10

	Nature	CM	TD	TP	Crédits
UE Research project	Teaching Unit (UE)				30 credits