

#### SCIENCES, TECHNOLOGIES AND HEALTH

# Soft matter and biophysics 1st year

Master in Nanosciences and nanotechnologies

 $\mathbf{O}$ 

FCTS **Baccalaureate** 60 credits



Duration 1 year

Component Ш **UFR PhITEM** (physique, ingénierie, terre,

environnement, mécanique)



Presentation

**Target level** 

+4

The course offers disciplinary training focused on development and characterization at the nanometric scale with a strong multidisciplinary dimension (physics, soft matter, biology). It relies on research groups working in this field, in particular in relation to the Fondation Nanosciences de Grenoble. This first year training will ensure preparation for the M2 Soft -Nano or NanoBiosciences. It can also prepare students for the M2 NanoMedecine. It equips students with skills in the development, manipulation, characterization, understanding and exploitation of nano-systems, nanomaterials, nano-structures and unique molecules, as well as knowledge of their application potentials. It makes students aware of the environmental and societal challenges of nanotechnologies. In addition, the mastery of modeling tools will be developed and reinforced for interested physicist students.

This track is opened to international students. All courses are given in english.

The curriculum contains:

- · General courses corresponding to 12 ECTS, among which 3 include the study of a foreign language
- · Core courses in nanosciences and nanotechnologies specific to soft matter and nanobioscience (27 ECTS) with a large focus on experimental teaching and projects on

the cleanrooms and nanosciences facilities of the Grenoble area

- Elective courses (totalizing 15 ECTS) for further specialization in nanosciences or for breadth.
- · Internships in research teams, 8 weeks

For more informations on this **C** track

The main objective of this track is to provide students with strong scientific and technical knowledge in microand nano-fabrication, manipulation, measurement and instrumentation at the nano-scale. This include among other, the functionnalization of surfaces, the manipulation of single cells, the use of optical techniques for observation and manipulation of single bio-molecules, etc... The program provides students with strong basis in biology, allowing them to pursue ambitious projects at the interface between biology and nano-technologies.

his Master Course gives you the opportunity to apply to the thematic program "Futurprod" of the UGA Graduate School. The Graduate School@UGA is a new training program through and for research which was launched in 2021 within the Université Grenoble Alpes, and which concerns all the schools and components of the UGA.

The objective of these thematic programs is to offer interested students an interdisciplinary training program and academic excellence combining university studies and laboratory internships. Each thematic program develops a specific line of research, allowing then to embark on a PhD, or to have a direct professional insertion.





The program regroups students registered in different mentions, master programs or engineer school tracks and working together in specific courses

Participation in the Graduate School@UGA is for two years (M1 and M2) and may open the possibility of obtaining an academic scholarship for two years for the best international students (non-French baccalaureate holders).

**International education :** Double degrees, joint degrees, Erasmus Mundus, Internationally-oriented programmes

# International dimension

- This track is affiliated to the Erasmus + master EMM Nanosciences and nanotechnologies. EMM Nano students join the track in the 2nd year
- Internships in research teams, 8 weeks the 1st year and 5 months the 2nd year, for preparing the master thesis

# Admission

## Access conditions

 Entry in this 1st year program: National diploma conferring the degree of license in a field compatible with that of the master; title or acquired recognized equivalent by the admissions committee of the University of Grenoble Alpes Continuing education: You must apply for the program under

the continuing education category:

- if you resume your studies after 2 years of interruption of studies
- or if you followed training under the continuous training regime one of the previous 2 years
- or if you are an employee, job seeker, self-employed

If you do not have the diploma required to be admitted to this track, 🖸 you can undertake a validation of personal and professional achievements (VAPP)

For more information, visit the website of the Continuing Education and Learning Branch

# Candidature / Application

Do you want to apply and register? Note that the procedure differs depending on the diploma considered, the diploma obtained, or the place of residence for foreign students. Let yourself be guided simply by following this

### Target

Bachelors in Physics, with some knowledge and interest for biology, or bachelors in *Engineering (Chemical, mechanical, or nanotechnology engineering)*, joint Physics-Chemistry, or joint Physics-Biology programs. Students with four year bachelor degrees can be admitted under the Research Intensive Track program, which allows for more time in a research laboratories in

### Fees

Tuitions fees 2023-2024 : 243 €+100€ CVEC

# And after

## **Further studies**

This track opens into M2 program such as NanoSoft or Nanobioscience. Nanomedecine is also possible.

# Useful info





# Contacts

Program director BOSSY Emmanuel emmanuel.bossy@univ-grenoble-alpes.fr

#### Program director

Anne-Marie CHARVET

#### Program administration

Registrar's Office for the Master in Nanosciences and nanotechnologies phitem.master.nano@univ-grenoble-alpes.fr

#### Program administration

Application phitem.candidature.etudiant@univ-grenoble-alpes.fr

#### Continuing education manager

Laura DI RUZZA fc-phitem@univ-grenoble-alpes.fr

## Partner schools

Grenoble-INP

# Course location(s) - City

Grenoble

### Campus

😭 Grenoble - Scientific Polygon

## Know more

Master website https://master-nanosciences.univ-grenoble-alpes.fr





# Program

### Master 1st year

#### Semester 7

	Nature	СМ	TD	TP	Crédits
UE Microscale mechanics and fluidics I : Mechanics	Teaching Unit (UE)				3 credits
UE Microscale mechanics and fluidics II: Fluidics	Teaching Unit (UE)	14h		10h	3 credits
UE Statistical physics I: Theory	Teaching Unit (UE)				3 credits
UE Surfaces and interfaces	Teaching Unit (UE)	14h	10h		3 credits
UE Statistical physics II : Computational aspects and introduction to AI	Teaching Unit (UE)				3 credits
GS_Soft-Nano_UE_Research Methodologies	Teaching Unit (UE)				6 credits
UE Quantum Physics I	Teaching Unit (UE)				3 credits
UE Solid State Physics I	Teaching Unit (UE)				3 credits
UE Optics	Teaching Unit (UE)	50h		8h	6 credits
UE Physics of biological systems	Teaching Unit (UE)				3 credits
UE Optic and magnetic spectroscopies	Teaching Unit (UE)				3 credits
UE Polymers 1	Teaching Unit (UE)	22h	12h	16h	6 credits
UE Electrochemistry	Teaching Unit (UE)			12h	3 credits
UE Physics of granular media	Teaching Unit (UE)				3 credits
UE Image and signal processing	Teaching Unit (UE)				3 credits





UE Molecular biology	Teaching Unit (UE)	20h	2h		3 credits
UE Molecular biology TP	Teaching Unit (UE)			24h	3 credits
UE Research Intensive Track I	Teaching Unit (UE)				3 credits
1 or 2 UEs up to 6 ECTS in another program	Teaching Unit (UE)				
UE Occupational integration	Teaching Unit (UE)				3 credits
UE French as a foreign language	Teaching Unit (UE)				3 credits

### Semester 8

	Nature	СМ	ID	IP	Crédits
UE Research Internship	Teaching Unit (UE)				6 credits
UE Nanosciences I	Teaching Unit (UE)	17h		8h	3 credits
UE Nanosciences II	Teaching Unit (UE)	15h		11h	3 credits
UE Ray-Matter Interaction	Teaching Unit (UE)	22h	3h		3 credits
UE Soft Matter I	Teaching Unit (UE)				3 credits
UE Soft Matter II : statistical physics aspects; polymers	Teaching Unit (UE)			4h	3 credits
UE Physical measurements at nanoscale by local probes	Teaching Unit (UE)	22h		8h	3 credits
UE Graduate School Soft Nano internship	Teaching Unit (UE)				6 credits
UE Research Intensive Track II	Teaching Unit (UE)				3 credits
UE Modelling and numerical simulations	Teaching Unit (UE)				3 credits
UE Cell biology	Teaching Unit (UE)	4h	12h		3 credits



UE Modelling in systems biology	Teaching Unit (UE)	10h	6h		3 credits
UE Experimental Protocol Design (in biology)	Teaching Unit (UE)	2h	6h	16h	3 credits
UE Physiology & Bioenergetics	Teaching Unit (UE)	10h	4h		3 credits
UE Polymers 2 chemistry and physico-chemistry	Teaching Unit (UE)				3 credits
UE Surface functionalization and applications I	Teaching Unit (UE)				3 credits
1 or 2 UEs up to 6 ECTS in another program	Teaching Unit (UE)				

