



MASTER

Matter Sciences

International training programs

- Materials engineering
- Nanosciences
- Electronic Materials, Components and reliability

Formation accessible en :

- FORMATION INITIALE FORMATION EN ALTERNANCE ENSEIGNEMENT À DISTANCE FORMATION CONTINUE

 Campus du Madrillet

sciences-techniques.univ-rouen.fr



**UFR Sciences
et Techniques**

PURPOSES

«Matter Sciences» is an international master program built on GPM's knowledge and skills. Our students are:

- Directly recruitable in France or abroad
- Able to go on with a PhD program

After a 2-month master program, our students have solid knowledge and skills about:

- The relations between physical properties and microstructure
- The mechanisms of materials ageing
- The techniques to characterize, measure and monitor materials properties and microstructures
- The numerical tools for materials science
- English (for both daily and scientific uses)
- The management of R&D projects



THE TRAINING PROGRAMS

After a common 1st year, students can select a specific training program:

Materials engineering: engineering polymer and metal alloys. (●)

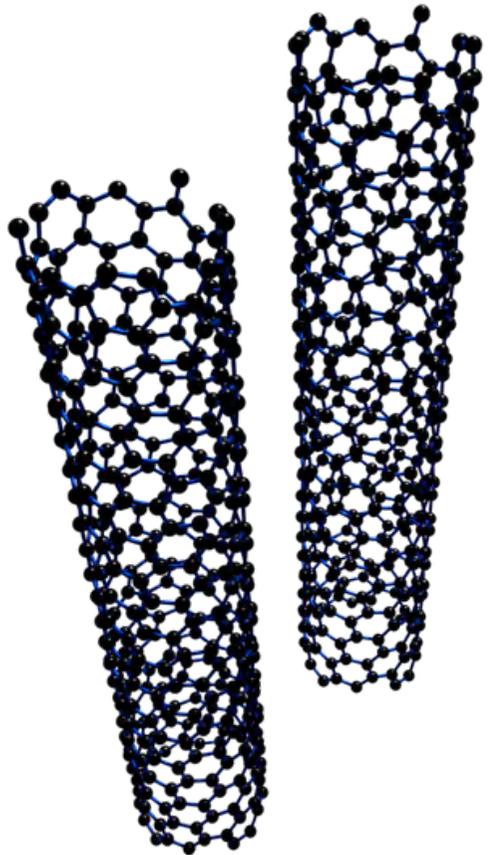
Nanosciences: innovating metal alloys and nano-materials. (●)

Electronic Materials, Components and reliability. (●)

The choice of a training program is determined by the choice of specific classes during the 2nd year of the master program.

For details:

<http://gpm.univ-rouen.fr/en/node/71>



ADMISSION REQUIREMENTS

1st year (M1): 3-year post-bachelor diploma in Physics, Physical Chemistry, Materials, Engineering, Sciences and technology.

2nd year (M2): M1 or equivalent diploma in Physics, Physical Chemistry, Materials, Engineering, Sciences and technology.

PROGRAMME

M1

Semestre 1

Thermodynamics (5 CE)

- Statistical thermodynamics
- Thermodynamics of solid solutions

Materials Structure (6 CE)

- From perfect to real crystal
- Atomic physics

Materials properties 1 (6 CE)

- Linear elasticity
- Physics of the solid state 1
- Hyper-elasticity, viscoelasticity, damage of polymers

Diffusion and phase transformations (6 CE)

- Diffusion in the solid state
- Phase transformations 1

Foreign languages (5CE)

- English
- Materials sciences and Mechanical Engineering

Business and employability (2 CE)

- Knowledge of business, Management
- Technological survey, Intellectual property

Semestre 2

Industrial materials (8 CE)

- Metals and metal alloys
- Polymers

Materials properties 2 (7 CE)

- Properties of macromolecular materials
- Relationship between microstructure and plasticity in metals

Physics of condensed matter (8 CE)

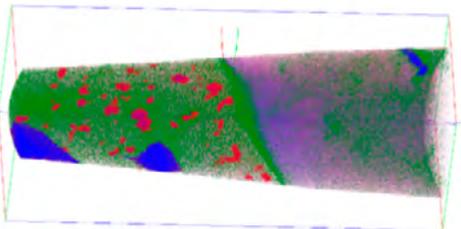
- Physics of the solid state 2
- Magnetic and dielectric properties

Foreign languages (2CE)

- English

Internship /duration : 3 months (5 CE)

- Laboratory or company, France or abroad



M2

Semestre 3

Numerical methods (6 CE)

- Monte Carlo simulation, Phase field methods
- Industrial numerical methods (DAO/CAO – Thermocalc)

Foreign languages (2CE)

- English

Polymers physics (11 CE) ●

- Polymers, plastics and plastic manufacturing
- Fundamentals about amorphous materials and glasses
- Polymer ageing and degradation
- Biopolymers et biocomposites
- Nanostructured polymers
- Semicrystalline polymers

Physical metallurgy (11 CE) ● ●

- Corrosion
- Mechanical degradation
- Phase transformations 2
- Materials exposed to radiation
- Symmetries

Physics of nanomaterials (11 CE) ● ●

- Elaboration and analyse of nanomaterials
- Magnetism
- Nanomagnetism
- Solid state physics and radiation-matter interaction
- Nano-optics and nanoelectronics

Characterization and components reliability (11 CE) ●

- Advanced physical measurements
- Characterization and physical analysis
- Operational and predictive reliability
- Micro-Nano devices: integration and capacity

Semestre 4

Characterization techniques (12 CE)

- Microscopy, Spectroscopies, Atom probe, Thermal analysis....
- R&D case study

Business and employability (3 CE)

- Employability
- Standards and quality

Internship /duration : 6 months (15 CE)

- Laboratory or company, France or abroad

INTERNATIONAL

«Nanosciences» and «Materials Engineering» training programs have an international dimension in that they allow improving language skills, discovering how research is done all over the world and establish a widespread network of international connections.

During the 1st year of the master program:

- 40h classes will be covered by English-speaking teachers,
- Students can apply for a 3-month internship abroad.

During the 2nd year of the master program,

- Classes will be taught in English,
- Students can apply for a 6-month internship abroad.

Selected candidates will have the chance of getting enrolled for the whole year at the University of Nebraska-Lincoln (USA), graduating from both universities (Rouen and Nebraska-Lincoln).



JOB OPPORTUNITIES

Students graduating SdM master program can be either recruited in the industry as executives, middle managers or engineers (project managing, research and development, production of metals and alloys, plastics, nano-materials, materials control and characterization...) or enrolled in a PhD program aiming to academical positions (professor, researcher...).

HEADS OF DEPARTMENT

M1

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M2

Materials engineering

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Nanosciences

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Electronic Materials, Components and reliability

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