

## 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,

- All 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

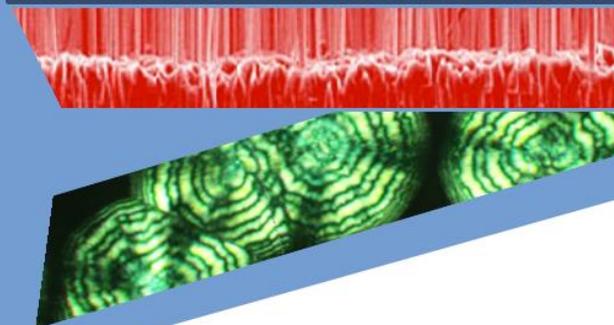
Students graduating SdM master program can be either recruited in the industry as executives, middle managers or engineers (project managing, research and development, production of metals and alloys, plastics, nano-materials, materials control and characterization...) or enrolled in a PhD program aiming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



## Matter sciences

### International training programs

- Materials engineering
- Nanosciences



**M1**  
Bertrand Radiguet  
bertrand.radiguet@univ-rouen.fr

**M2 Materials engineering**  
Allisson Saiter  
allisson.saiter@univ-rouen.fr

**M2 Nanosciences**  
Denis Ledue  
denis.ledue@univ-rouen.fr

**International exchanges**  
Antonella Esposito  
antonella.esposito@univ-rouen.fr

**Groupe de Physique des Matériaux GPM**  
UMR CNRS 6634  
Avenue de l'Université - CS 70012  
76801 Saint-Etienne-du-Rouvray Cedex  
<http://gpm.labos.univ-rouen.fr>  
<http://www.ammelecap.com>

[Scolarite.SciencesMad@univ-rouen.fr](mailto:Scolarite.SciencesMad@univ-rouen.fr)

[www.univ-rouen.fr](http://www.univ-rouen.fr)

UFR Sciences et Techniques - Service communication ☎ 02 35 14 66 03 ✉ Sylvie.Lendepert@univ-rouen.fr

## 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. ( ● )

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

## 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.

S1

### 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

S2

### 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

S3

### 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

S4

### 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