

MECHANICS OF MATERIALS FOR THE ENGINEERING AND INTEGRITY OF STRUCTURES

2nd year of Master degree - Fall semester

All students may follow **common core courses**. In addition to these courses, **all students must choose only one option out of four**, each one consisting of **fundamental** and **complementary courses**:

- Option 1: Damage and fracture of materials and structures
- Option 2: Metal processing and additive manufacturing
- Option 3: Life cycle of polymers and composite materials
- Option 4: Machining and simulation

The exchange offer **corresponds to** the first half of the academic year, **fall semester (from September to January)**.

A minimum of **20 ECTS** (European Credit Transfer and Accumulation System) are **required** for the **learning agreement**.

All courses are taught **in English**.

Please note that **courses** are **place-limited**.

For information on the **requirements of each course**, please check the **syllabus** on our [website](#).

Language courses take place at **PSL engineering schools (Mines Paris-PSL and ESPCI Paris-PSL)** located near the **Panthéon** and the **Luxembourg Garden**.

Scientific courses take place at **various campuses**:

- **A&M - Arts et Métiers ParisTech**, located at: **151 Boulevard de l'hôpital, 75013 Paris**
- **UPS - Université Paris-Saclay (ENS or CentraleSupélec)**, located at: **4 avenue des Sciences or 3 rue Joliot Curie 91190 Gif-sur-Yvette (same bus stop) ⚠ (Please note that this campus is located on the outskirts of Paris)**

When choosing your accommodation, please ensure that Gif-sur-Yvette and the 13th arrondissement of Paris are easily accessible, as some courses are held at two different campuses according to the dates.

CORE COURSES

- NSM23 - **Materials Science** (3 ECTS, A&M and UPS)
- NSM24 - **Materials constitutive equations and thermodynamic of solids** (3 ECTS, UPS)
- NSM25 - **Numerical methods for continuum mechanics** (3 ECTS, A&M)
- NSM26 - **Advanced experimental methods** (3 ECTS, A&M and UPS)
- NSM27 - **Research project-Bibliographic study** (3 ECTS, UPS)
- NSM43F - **Scientific communication in foreign language** (3 ECTS, PSL)

OPTION : DAMAGE AND FRACTURE OF MATERIALS AND STRUCTURES

All courses are eligible for selection. From 1 onwards, with the possibility of attending all 3 courses.

Only **one** course from the list below can be selected.

- NSM28- **Fracture mechanics** (3 ECTS, UPS)
- NSM29- **Damage and fracture of polymers and composites** (3 ECTS, UPS)
- NSM31- **Continuum damage mechanics** (3 ECTS, A&M)

- NSM32- **Plastic strain processing** (3 ECTS, A&M)
- NSM37- **Processing of polymers and composites** (3 ECTS, A&M)
- NSM30- **Dynamic behaviour and failure of materials** (3 ECTS, UPS)
- NSM35- **Algorithmic modelling of physical processes** (3 ECTS, UPS)
- NSM41- **Fatigue of materials** (3 ECTS, A&M)
- NSM42- **Eco-materials** (3 ECTS, A&M and UPS)

OPTION : METAL PROCESSING AND ADDITIVE MANUFACTURING

All courses are eligible for selection. From 1 onwards, with the possibility of attending all 3 courses.

Only **one** course from the list below can be selected.

- NSM32- **Plastic strain processing** (3 ECTS, A&M)
- NSM33- **Metal additive manufacturing** (3 ECTS, A&M)
- NSM34- **Numerical simulation for metal processing** (3 ECTS, A&M)

- NSM31- **Continuum damage mechanics** (3 ECTS, UPS)
- NSM37- **Processing of polymers and composites** (3 ECTS, A&M)
- NSM30- **Dynamic behaviour and failure of materials** (3 ECTS, UPS)
- NSM35- **Algorithmic modelling of physical processes** (3 ECTS, A&M)
- NSM41- **Fatigue of materials** (3 ECTS, A&M)
- NSM42- **Eco-materials** (3 ECTS, A&M and UPS)

OPTION : LIFE CYCLE OF POLYMERS AND COMPOSITE MATERIALS

All courses are eligible for selection. From 1 onwards, with the possibility of attending all 3 courses.

Only **one** course from the list below can be selected.

- NSM36- **Durability and recycling of polymers and composite materials** (3 ECTS, A&M)
- NSM37-**Processing of polymers and composites** (3 ECTS, A&M)
- NSM38- **Mechanical behavior of polymers** (3 ECTS, A&M)
- NSM31- **Continuum damage mechanics** (3 ECTS, UPS)
- NSM32- **Plastic strain processing** (3 ECTS, A&M)
- NSM30- **Dynamic behaviour and failure of materials** (3 ECTS,UPS)
- NSM35- **Algorithmic modelling of physical processes** (3 ECTS, A&M)
- NSM41- **Fatigue of materials** (3 ECTS,A&M)
- NSM42- **Eco-materials** (3 ECTS, A&M and UPS)

OPTION : MACHINING AND SIMULATION

All courses are eligible for selection. From 1 onwards, with the possibility of attending all 3 courses.

Only **one** course from the list below can be selected.

- NSM32- **Plastic strain processing** (3 ECTS, A&M)
- NSM39- **Multi-physical approach of cutting,materials and material integrity** (3 ECTS, A&M)
- NSM40- **Advanced machining and its applications** (3 ECTS, A&M)
- NSM31- **Continuum damage mechanics** (3 ECTS, A&M)
- NSM37- **Processing of polymers and composites** (3 ECTS, A&M)
- NSM30-**Dynamic behaviour and failure of materials** (3 ECTS, UPS)
- NSM35-**Algorithmic modelling of physical processes** (3 ECTS, A&M)
- NSM41- **Fatigue of materials** (3 ECTS, A&M)
- NSM42- **Eco-materials** (3 ECTS, A&M and UPS)