



MASTER'S DEGREE  
PROGRAMME // M1 + M2



# MECHANICAL ENGINEERING

*Sustainable Manufacturing  
& Advanced Technologies*



# MASTER IN MECHANICAL ENGINEERING

## *Sustainable Manufacturing & Advanced Technologies*

An international 2 year Master programme with 4 semesters fully taught in English at Ecole Centrale de Lyon and Mines Saint-Etienne, 5 month internship and projects in a multidisciplinary environment.

### Description

This training innovatively combines theoretical and applied courses (via projects and labs) with internships in a multidisciplinary environment. It covers a large spectrum starting from fundamentals of advanced manufacturing processes, materials science and characterization in M1 up to the cutting edge research on key topics in M2 such as component durability.

### Objectives

**SMAT** intends to train a new generation of graduates and future industrial managers that are capable to **embrace future technological and environmental challenges towards a sustainable environment by:**

- providing them with **strong basis** in materials and advanced manufacturing processes ;
- Developing a **practical know-how** on a wide range of manufacturing and characterization techniques;
- Training them in **collaborative work and project management**;
- Proposing a key **specialization** in sustainable manufacturing.



### FUNDAMENTALS OF MANUFACTURING PROCESSES\*

30 ECTS

- Basics of production engineering
- Metalworking processes
- Additive manufacturing
- High temperature processes
- Physical Measurement
- Transverse project on manufacturing
- Research Methods
- French for beginners



### FUNDAMENTALS OF MATERIALS\*

30 ECTS

- Microstructure and mechanical properties
- Plastic deformation
- Phase diagrams
- Materials selection
- Solid state transfo.
- Materials mechanics
- Materials characterization
- Surface characterization



### SPECIALIZATION IN SUSTAINABLE MANUFACTURING\*

30 ECTS

- Surface Engineering
- Modelling of surface integrity
- Functional & in-use properties
- Component repair
- Life Cycle Assessment
- Strategic Management
- Advanced French



### INTERNSHIP\*

30 ECTS

- Minimum 20 weeks
- Written report
- Oral presentation

\* All the courses are taught **exclusively in English**