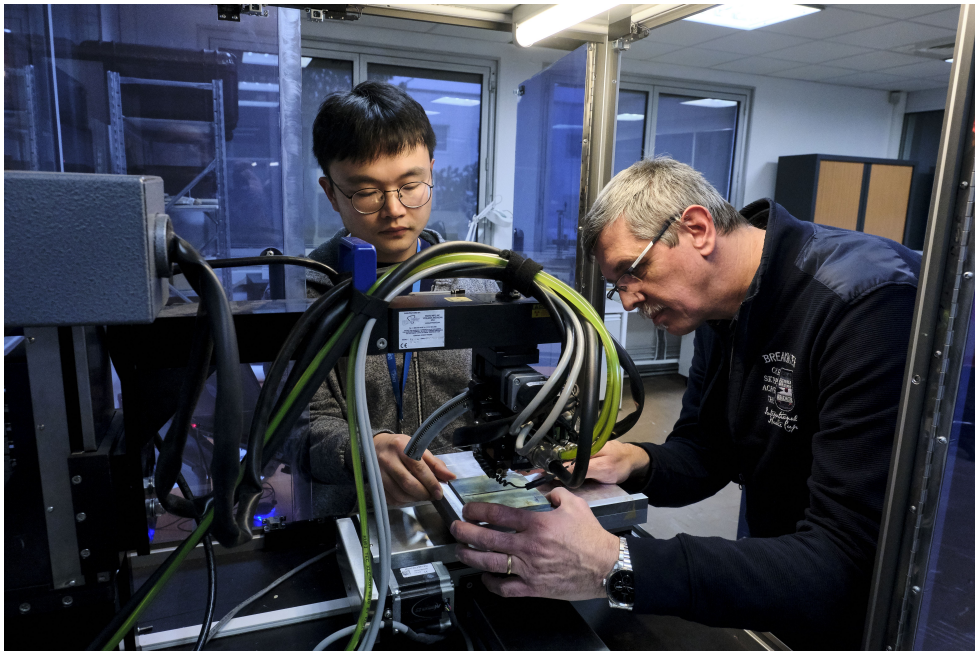
CENTRALE LYON

International Master Sustainable Manufacturing and Advanced Technologies

Degree level: Master
Training time: 2 years
Language: English
Status: Student
Campus: Saint-Etienne Campus

Objectives

The **master Sustainable Manufacturing and Advanced Technologies** prepares future industry executives, researchers and teacher-researchers by offering them unique technical and scientific expertise. They acquire a solid grounding in the **domain of materials** and **advanced manufacturing processes** enabling them to **meet future technological and environmental challenges for a sustainable environment**



This master's program aims to:

- To provide the graduates with **strong basis** in materials and advanced manufacturing processes
- To develop a **practical know-how** on a wide range of manufacturing processes and characterization techniques
- 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**
- To develop **international and intercultural skills;**
- To train the graduates in **collaborative work and project management**
- To propose key **specialization** in sustainable manufacturing and, for some students, insights into digital, smart and clean manufacturing at a partner university.

Program

The course is divided into four semesters taught by Centrale Lyon at its Saint-Etienne campus and Mines Saint-Etienne.

First year

The first year of the **Master** is structured in two complementary semesters. Students are introduced to the **fundamental concepts of manufacturing processes at Centrale Lyon** then acquire the **fundamentals of materials at the Ecole des Mines de Saint-**

Semester 1: Fundamentals on manufacturing processes

First semester courses take place at Centrale Lyon on the Saint-Etienne campus.

- Basics of production engineering
- Metalworking processes
- Additive manufacturing
- High-temperature processes
- Physical measurements
- Cross-disciplinary project on manufacturing technologies
- Research methods
- Modern language

Semester 2: Fundamentals of materials

Second-semester teaching takes place at **Mines Saint-Étienne**.

- Materials 2 : crystal defects, mechanisms of plastic deformation, solid state diffusion and crystallographic texture formation
- Materials mechanics 2 : Failure modes, Mechanical failure analysis, Important mechanical testing methods
- Materials characterization 2 : X-ray fluorescence, scattering, diffraction and imaging; mass spectroscopy, thermal analysis.
- Computing 2: Finite Element formulation of thermo-elasticity problems in Materials science, Coding algorithms in Python, Use of Abaqus Finite element Software
- General training 2: French and/or English, Bibliographic survey, Scientific writing and presenting, Preparation to professional life

Second year

In the second year, students follow a specific ‘Sustainable Manufacturing’ course run by École Centrale Lyon and Mines Saint-Etienne, before completing their course with a 5-month work placement.

Semester 3: Sustainable Manufacturing

- Material removal and wear modeling
- Surface integrity modeling
- Functional and usage properties
- Component repair using thick coatings
- Lifecycle analysis
- Cross-disciplinary teaching units
- Strategic management
- Language: advanced French

Some students who have completed the first year may, on application, take part in an academic exchange at a partner institution.

Semester 4: Work placement

Students must complete a 5-month work placement in industry or in one of the partner research laboratories.

Diploma and certification

This course awards a national master's degree - controlled by the State.

Career opportunities

- **Industry: Employment opportunities in R&D or interdisciplinary project manager positions in the energy, transport, manufacturing and material production sectors**
- **Academia: Research or higher education with possibilities to go on a PhD**

Focus

- A program taught entirely in english at École Centrale de Lyon and Mines Saint-Etienne
- International mobility opportunities at a partner university
- Theoretical and applied courses on manufacturing processes and advanced materials
- A 5-month internship and projects in a multidisciplinary environment

Admission requirements and application

Pre-requisites

- First-year registration: a bachelor's degree in a scientific field related to the themes of this master's degree. English language, minimum level B2.
- Registration in second year possible in case the candidate has completed a first year master's degree in a related discipline. English language, minimum level B2.

Application

Applications are considered on the basis of a dossier.

Discover application procedures

Tuition fees

Knowing and anticipating your expenses is essential before making a serene commitment to training.

Discovering master's tuition fees Discover the average study budget at Centrale Lyon