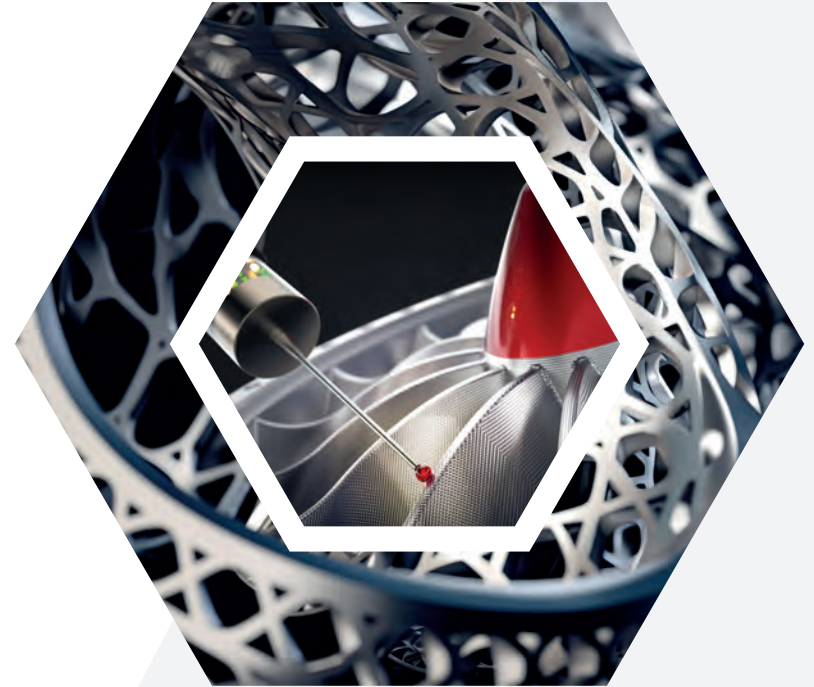




MASTER'S DEGREE  
PROGRAMME // M2



CENTRALELYON  
**ENISE**



# MECHANICAL ENGINEERING

*Surface Interface and  
Structure Engineering*



# MASTER IN MECHANICAL ENGINEERING

## *Surface Interface and Structure Engineering*

2 semesters taught in French, including 4 months of internship in co-accreditation with École Centrale de Lyon and Université de Lyon 1

### Description

The Surfaces, Interfaces and Structures Engineering track is a specialization track of the Master's degree in Mechanics (M2) and covers all the points listed in the title. The manufacture of mechanical parts, whatever the process used, involves creating structures, functional surfaces, geometries, etc., to meet given functionalities.

**Surface engineering** encompasses all mechanical, thermomechanical, physicochemical and coating processes, among others, which modify the metallurgical structure and thus the behaviour of surfaces and structures, as well as their durability. **Interface engineering** covers all theories of contact, friction and wear, in other words, everything to do with general tribology in the broadest sense. **Structural engineering** covers the physics of additive manufacturing processes.

### Objectives

Provide students with the knowledge in materials science, process physics, surface and interface physics to master the integrity of surfaces and structures of manufactured mechanical parts. This range of knowledge will give students the skills to design and manufacture mechanical systems that are durable, functional and economical, while respecting the ecological environment. Mastering the engineering of surfaces, interfaces and structures is also essential for participating in the decarbonization process and the circular economy, right from the design stage.



### COMMON COURSES\*

12 ECTS



*Finite element method in mechanics*



*Modeling in mechanics of materials*

### SPECIALIZATION COURSES\*

12 ECTS



*Surface Engineering*



*Coating development methods*



*General tribology*



*Surface and structural integrity*

### OPENING COURSES\*

6 ECTS



*Physical Measurement*



*Additive manufacturing*



*Multi-physics couplings for processes*



*Tool-material interaction*

### COMPLEMENTARY COURSES\*

9 ECTS



*English for business communication level 2*



*Socio-economics of business*



*Internship preparation. Bibliography*

### INTERNSHIP\*

21 ECTS



*Minimum 16 weeks*



*Written report*



*Oral presentation*

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