CENTRALE LYON

Master 2 Mechanics

Degree level: Master
Training time: 1 year
Language: French
Status: Student
Campus: Lyon-Ecully Campus, Saint-Etienne Campus

Objectives

The **Master 2 Mechanics** at Centrale Lyon aims to train experts in the design, analysis, and optimization of complex mechanical systems through **5 specialization tracks**:

- Biomechanics
- Dynamics of Structures and Systems
- Surface Engineering of Interfaces and Structures
- Fluid Mechanics and Energetics
- Digital Solid Mechanics

Program

Biomechanics Structures and Systems Dynamics

Surfaces, Interfaces and Structures Engineering

Fluid Mechanics and Energy Computational Solid Mechanics

This pathway provides a deeper scientific grounding in the analysis and modeling of living tissues.

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Courses

- Finite element method in mechanics
- Modeling in mechanics of materials
- Tribology of living organisms
- Bioengineering
- Bio-materials
- Anatomy and Surgery
- Additive manufacturing
- English for professional communication level 2
- Corporate socio-economics

Internship

Students must complete a 5-6 month internship in a laboratory or within a company.

Discover the syllabus

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Courses

- Physical mechanics
- Mechanics and thermodynamics of continuous media
- Functional anatomy and surgery
- Tribology: principles and applications
- Materials behavior
- Tissue engineering and biomaterials

Internship

Students must complete a 5-6 month internship in a laboratory or within a company.

This course specializes in mechanics and vibration. It provides a mastery of modeling and numerical simulation tools and an understanding of physical phenomena in mechanics.

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Courses

- Physical mechanics and thermodynamics of continuous media
- Deepening, applications (DSM)
- Structural dynamics and machines
- Structural control and optimization
- Advanced modeling of systems & structures

Students can also choose from free UEs and complementary modules according to their training project.

Internship

Students must complete a 3-6 month internship in a laboratory or company.

Discover the syllabus

This pathway provides knowledge in materials science, process physics, surface and interface physics, to master the integrity of surfaces and structures of manufactured mechanical parts.

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Courses

- Physical mechanics
- Mechanics and thermodynamics of continuous media
- Tribology: principles and applications
- Soft matter: nanosystems and biological interfaces
- Sustainability of materials and nanostructures
- Characterization of surfaces and nanostructures
- Ultra-thin layers and functionalized Surfaces
- English
- Socio-economics

Internship

Students are required to complete a 3- to 6-month internship in a laboratory or within a company.

Discover the syllabus

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Courses

- Finite element method in mechanics
- Modeling in mechanics of materials
- Surface engineering
- Coating development methods
- General tribology
- Integrity of surfaces and structures
- Additive manufacturing
- Multi-physics for processes
- Tool-material-environment interaction
- Physical measurements applied to manufacturing processes
- English for professional communication level 2
- Corporate socio-economics

Internship

Students must complete a 3 to 6-month internship in a laboratory or within a company.

The Fluid Mechanics and Energy (MFE) course is designed to train students for careers in research and development in fields requiring in-depth knowledge of fluid mechanics. The program offers both fundamental courses and more specific courses geared towards energy and environmental issues.

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Courses

- Physical mechanics
- Mechanics and thermodynamics of continuous media

- Numerical simulation of flows
- Turbulence in flows
- Flow in the environment
- Aerodynamics, Propulsion
- Fluid Interfaces, Transfers, Mixing
- Fundamental Fluid Mechanics
- English

Students can choose additional courses as part of the free UE.

Internship

Students must complete a 3-6 month internship in a laboratory or company.

Discover the syllabus

The Computational Solid Mechanics pathway trains experts in the development of innovative simulations in the context of virtual engineering, which is increasingly present in industry.

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Learning

- Finite element method in mechanics
- Modeling in mechanics of materials
- Big data, model reduction and numerical twins
- Multi-physics couplings for processes
- Advanced numerical methods
- Intensive calculations
- Numerical methods for simulating mechanical models in dynamics
- English
- Corporate socio-economics

Internship

Students are required to complete a 3-6 month internship in a laboratory or within a company.

Diploma and certification

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



Career opportunities

- Design, research and development manager
- Mechanical design engineer
- Production/industrialization engineer
- Calculation engineer
- Engineering or innovation consultant

Focus

A master's degree in co-accreditation with Université Claude Bernard Lyon 1 (UCBL) and Ecole des Mines Saint Etienne.

As part of this partnership, some courses will take place on their campuses.

- Université Claude Bernard Lyon 1 43, boulevard du 11 novembre 1918, 69100 Villeurbanne
- Mines Saint-Étienne, 158 Cour Fauriel, 42100 Saint-Étienne

Admission requirements and application

Pre-requisites

- Students holding a Master 1 or equivalent at Bac+4 (240 ECTS) obtained in civil engineering.
- Centrale Lyon engineering students as part of a double degree.

Application

This course is open to Centrale Lyon engineering students as part of a double degree via the dedicated platform.

For all external applicants, please consult the Université Lyon 2 website.

FIND OUT HOW TO APPLY

Tuition fees

Acknowledging and anticipating your expenses is essential before committing to a training course with confidence.

FIND OUT ABOUT MASTER'S COURSE FEES DISCOVER THE AVERAGE STUDY BUDGET AT CENTRALE LYON

Administrative contact

Education department - French-speaking Masters

Information and registration

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