LICENCE (BACHELOR)
PHYSICS AND CHEMISTRY
MECHANICS

ENTRY REQUIREMENTS

First year admission: a Science Baccalaureate or an equivalent qualification. 2nd year admission by application after a 1-year general course in physics and chemistry. 3rd year admission after a 2-year general course in mechanics.

ACQUIRED SKILLS

Acquisition of a sound general scientific training in both theory and experiments. The ability to solve theoretical problems in the field of mechanics and its applications. Ability to implement an experimental process. Ability to gather, handle and present results. Ability to explain and present, both verbally and in writing, the approach to a project, the knowledge involved and the results.

YOUR FUTURE CAREER

The vast majority of students continue their studies with a Master's degree or at an engineering school. This degree particularly offers access to the UPEM Master's in "Civil Engineering" or the "Mechanics" stream at the École Supérieure d'Ingénieurs Paris Est. It also leads to Master's degrees at other universities or engineering schools geared towards mechanics. A 2-year degree can lead to professional degrees in "Careers in environmental protection and management" at the UPEM, or in "Careers in Instrumentation, measurement and quality control" or "Chemistry and Physics of Materials" at the UPEC.

BENEFITS OF THE PROGRAM

This degree offers students gradual specialisation, with a choice of pathways only in the third year of the degree. Students are therefore able to acquire a broad foundation of scientific knowledge in mechanics, as well as in physics, chemistry, electronics and applied mathematics and computer science, essential for fields such as energy, materials or the environment. The first year is a transition year, with tailored teaching in groups of 30 - 35 (not in a lecture theatre).
YEAR 1, SEMESTER 1.

Unit 1 Mathematical tools (ECTS : 4) - Mathematics - Statistics - Digital analysis
Unit 2 Engineering Sciences (ECTS : 4) - Thermodynamics and thermics - Introduction to materials - Control of Discrete Systems - Automation
Unit 3 Mechanical systems and CAD (ECTS : 3) - Analysis of mechanical systems - Introduction to the digital chain (CAD I) - Mechanics of Solids and Finite Elements I
English Unit (ECTS : 2) - English
Communication and Management Unit (ECTS : 2) - Communication - The company, its players, its functions - Business organisation: cost structures for example - Executing the project and the risks involved
Apprenticeship Unit (ECTS : 2) - Apprenticeship tutorial support - Apprenticeship exercises
Professional Segment Unit (ECTS : 13)

YEAR 1, SEMESTER 2.

Unit 1 Tools for Understanding and Adaptation (ECTS : 2) - Fourier analysis - Mechanics of Solids and Finite Elements II
Unit 2 Engineering Sciences (ECTS : 2) - Heat exchangers and practical exercises in thermics - Practical exercises in Control of Discrete Systems - Automation
Unit 3 CPM option - Design (ECTS : 4) - Mechanical Design and CAD - Power transmission
Unit 4 CPM option - Production (ECTS : 4) - Mechanical Production - Analysis of production constraints - Geometric control of parts
Unit 5 MSE I (Materials Science and Engineering) (ECTS : 4) - Metal production - Structures and properties of metals
Unit 6 MSE Option II (Materials Science and engineering) (ECTS : 4) - Characterisation of metals - Durability of metals
English and Communication Unit (ECTS : 3) - English - Communication
Apprenticeship Unit (ECTS : 2) - Apprenticeship tutorial support - Apprenticeship exercises
Professional Segment Unit (ECTS : 13)

YEAR 2, SEMESTER 3.

Unit 1 Mathematics - Partial Differential Equations (ECTS : 2) - Mathematics - Partial Differential Equations
Unit 2 Mechanics (ECTS : 3) - Course in Mechanics of Deformable Solids - Beams - Dynamics of solids - Vibration
Unit 3 Engineering Sciences (ECTS : 2) - Thermodynamics - Fluid Mechanics
Unit 4 Sensors and control (ECTS : 4) - Sensors and measures - Automation - Control of continuous and discrete-time systems
English Unit (ECTS : 2) - English
Communication and Management Unit (ECTS : 2) - Communication - Workload, work and planning - Recruiting team members - Legal and contractual management - Organisation: business profitability
Apprenticeship Unit (ECTS : 2) - Apprenticeship tutorial support - Apprenticeship exercises
Professional Segment Unit (ECTS : 13)

YEAR 2, SEMESTER 4.

Unit 1 Design and production - Common core (ECTS : 2) - Statistical control of production - Choosing materials
Unit 2 Engineering Sciences and Applications (ECTS : 3) - Fluid mechanics - Practical Exercises - Applied thermodynamics - MVD practical exercises
Unit 3 MDC option - Design (ECTS : 3) - Mechanical Design - Analysis of mechanical systems - Digital chain and Project
Unit 4 MDC option - Production (ECTS : 3) - Mechanical Production - Analysis of production constraints - Production Organisation and Management
Unit 5 MSE Option - Composites, glass and ceramics (ECTS : 4) - Composites - Glass and ceramics
Unit 6 MSE Option - Organic polymers (ECTS : 2) - Organic polymers
English Unit (ECTS : 2) - English
Communication and Management Unit (ECTS : 2) - Communication - Initialisation, planning and steering
Apprenticeship Unit (ECTS : 2) - Apprenticeship tutorial support - Apprenticeship exercises
Professional Segment Unit (ECTS : 13)

YEAR 3, SEMESTER 5.

Unit 1 Tools for Understanding and Adaptation (ECTS : 6) - EF mathematical formulations - Reliability
Unit 2 Engineering Sciences (ECTS : 7) - Applied Mechanics - Logistics
Unit 3 Design and production of mechanical systems (ECTS : 12) - Integrated Design - CERTA
Communication and Management (ECTS : 5) - Communication - Business approach for projects - Sustainable development - Prep. for the assistant project manager certificate - Risk and change management - Globalisation
Extra-curricular Skills Unit (ECTS : 3) - Optional (project, international, association)

YEAR 3, SEMESTER 6.

Apprenticeship Unit (ECTS : 4) - Apprenticeship tutorial support - Apprenticeship exercises
Professional Segment Unit (ECTS : 26)