Université Paris-Saclay

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M2 Complex systems

Master's degree

Specialisation Physique fondamentale et applications

Enrolment type

Formation initiale

Formation continue

Language(s) of instruction

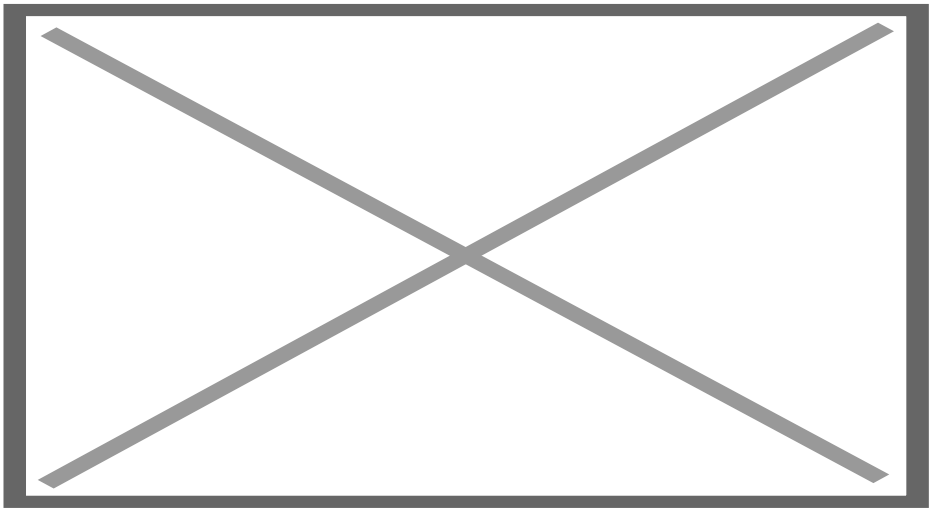
English

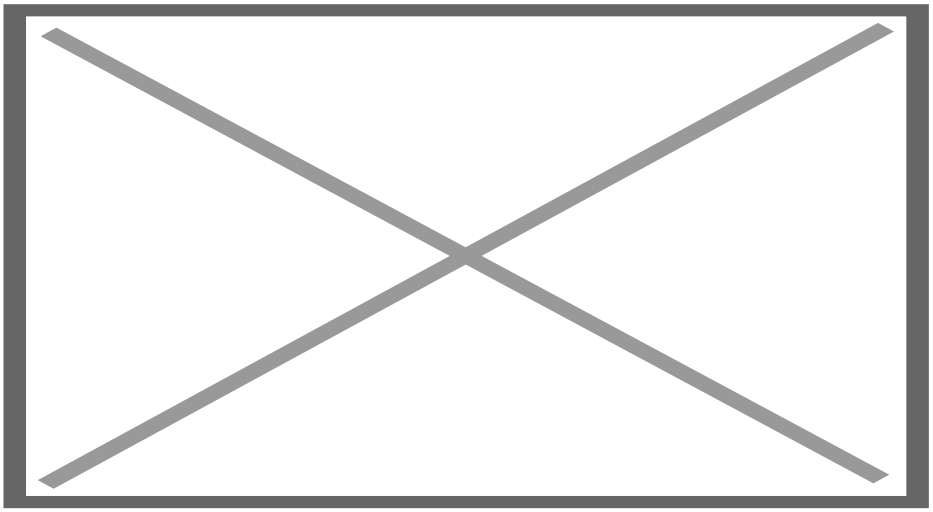
https://physics-complex-systems.fr/

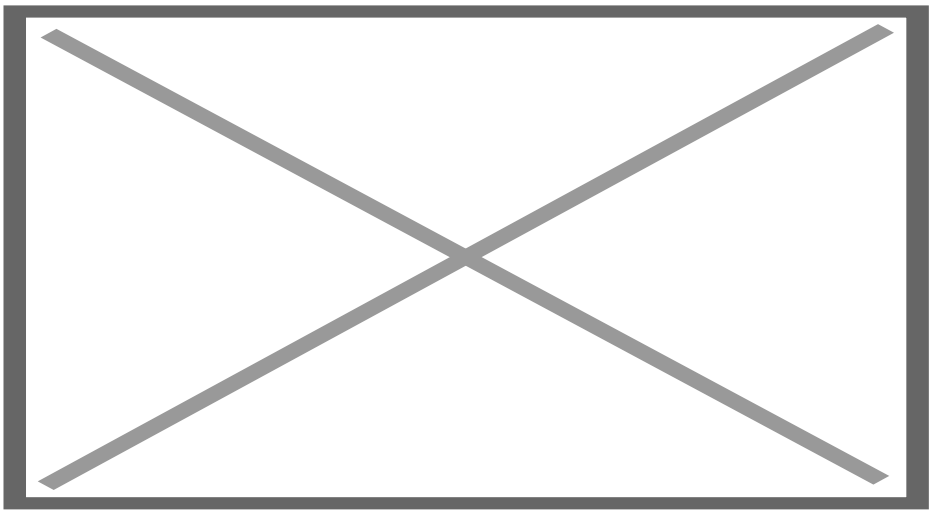
half of the second semester is devoted to a three months internship

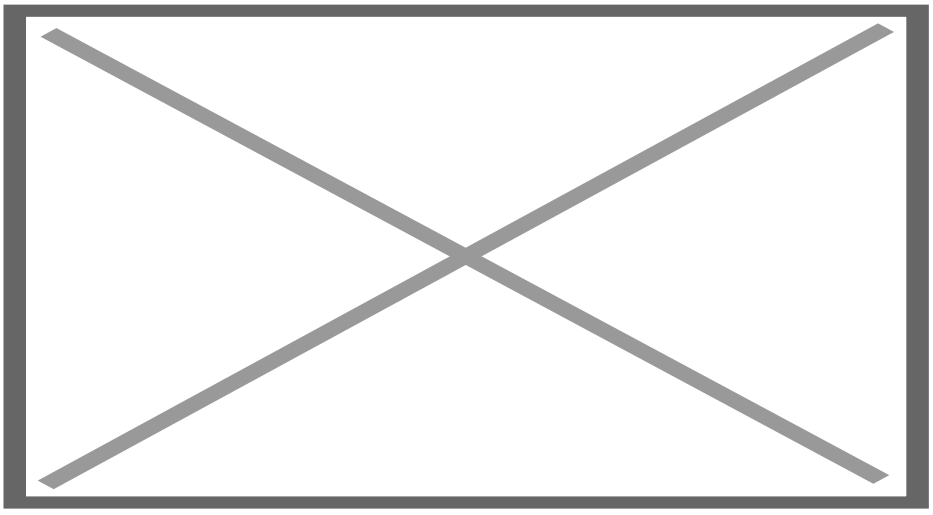
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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

Understand the concept of complexity in physics and related disciplines, its issues and critical questions.

Objectives

The goal is to provide a state-of-the-art research-oriented education in fundamental physics. Complex systems are thereby studied with the tools of statistical physics at or out-of equilibrium, field theory, stochastic processes, dynamical systems, non-linear physics, inference techniques and computational approaches. These systems encompass complex networks, active matter, the interface between social sciences and physics, soft matter, biological systems, complexity in the quantum realm, or questions raised in the context of « big data » and « machine learning ».We prepare students to do their PhD in one of the many university or industrial laboratories that deal with the physics and modelling of complex systems. Some students enter the private sector right after receiving their master's degree.Details on the programme : cf. https://physics-complex-systems.fr/

Admission

Capacity

Available Places

25

Target Audience and Entry Requirements

The programme is an extension of the fundamental physics course. The main prerequisite is a good standard in statistical physics, quantum physics and mathematics.

Période(s) de candidature

Inception Platform

From 15/03/2026 to 28/06/2026

Supporting documents

Compulsory supporting documents

Motivation letter.

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Curriculum Vitae.

Additional supporting documents

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Document indicating the list of local M2 choices available here : https://urlz.fr/i3Lo.

Supporting documents :
- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed	Lecture/practical	directed study/practical class	d l
Nonlinear physics and dynamical systems	3	Semestre 1	26						
Charger le détail									
Computational science	6	Semestre 1	52						
Charger le détail									
Statistical field theory	6	Semestre 1	52						
Charger le détail									
Stochastic processes	6	Semestre 1	52						
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed	Lecture/practical	directed study/practical class

Introduction to quantum out of equilibrium dynamics	3	Semestre 1	26
Charger le détail			
Advanced non-linear physics	3	Semestre 1	26
Charger le détail			
Disordered systems	3	Semestre 1	26
Charger le détail			
Biophysics	3	Semestre 1	26
Charger le détail			
Nonequilibrium and active systems	3	Semestre 1	26
Charger le détail			
Quantum information	3	Semestre 1	26
Charger le détail			
Statistical field theory and Soft matter	3	Semestre 1	26
Charger le détail			

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Introduction à la biologie	3	Semestre 1	25					
Charger le détail								
Laboratoires sur puce	6	Semestre 1	50					
Charger le détail								
Microfluidique	3	Semestre 1	30					
Charger le détail								
Techniques de microfabrication	3	Semestre 1	30					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Charger le détail Tutorat bibliographique	3	Semestre 1						
Charger le détail UE d'orientation thématique Mécanique des fluides	12	Semestre 1	100					
Charger le détail Microfluidique et microfabrication	6	Semestre 1	46		15			
Charger le détail Interfaces et dispersions, applications industrielles	3	Semestre 1	45					
Charger le détail Rhéologie des fluides complexes	6	Semestre 1	22	5	30			
Charger le détail Anglais	3	Semestre 1	33					
Charger le détail Elasticité et ses applications industrielles	6	Semestre 1	21	21				
Charger le détail Milieux granulaires	3	Semestre 1	20	20	15			
Charger le détail								

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Systemes Colloidaux : applications biologiques et industrielles	3	Semestre 1	15					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Insertion Professionnelle	3	Semestre 1	25					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Milieux Poreux et écoulement dans les roches	3	Semestre 1	22.5					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Machine Learning	3	Semestre 2	28					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Theoretical Physics Spring School of Complex Systems	12	Semestre 2	112					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Traffic modelling : jams, crowds and molecular pedestrians	3	Semestre 2	28					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class
Econophysics	3	Semestre 2	28					

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c
Statistical physics of ecosystems	3	Semestre 2	28						
Charger le détail									
Random matrix theory and applications	3	Semestre 2	28						
Charger le détail									
Out of equilibrium statistical physics	3	Semestre 2	28						
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distanc learni cours
Stage PCS	18	Semestre 2							
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distanc learni cours
Stage MF	30	Semestre 2							
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distanc learni cours
Stage FCMD	30	Semestre 2							
Charger le détail									

Teaching Location(s)

ORSAY
PARIS 05
PARIS 13

Contact

- **Christophe TEXIER**

http://www.universite-paris-saclay.fr/formation/master/physique-fondamentale-et-applications/m2-systemes-complexes