Université Paris-Saclay

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Add to Compare

M1 Calcul Haute Performance, Simulation

Master's degree
Specialisation Calcul haute performance, simulation
Language(s) of instruction
French

The M1 High Performance Computing, Simulation is a professional and research-oriented master's degree that aims to train high-level scientists capable of mastering two major technological developments: the use of high-performance computers and digital simulation.

It provides access to both M2 CHPS tracks: “High Performance Computing and Simulation” and “Modeling and Simulation with High Performance Computing.”

Teaching units

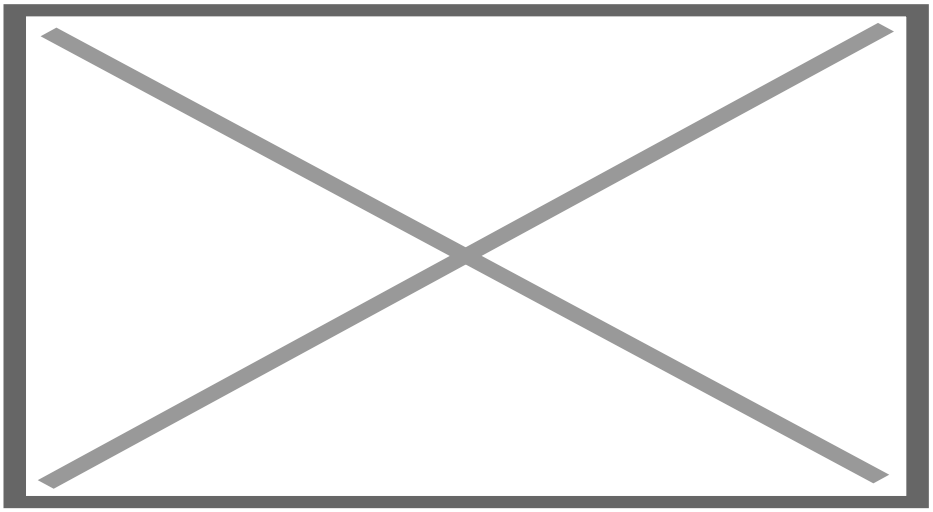
Semester 1

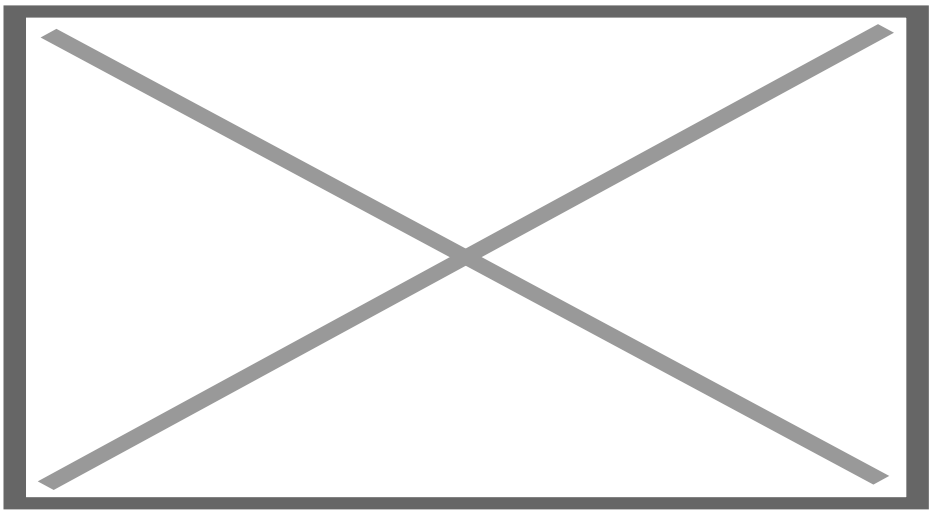
- Fudamentals of Mathematics for HPC (W. alby – Paris-Saclay / UVSQ)
- Software Engineering for HPC & AI (P. de Oliveira – Paris-Saclay / UVSQ)
- Parallel Architectures (W. Jalby – Paris-Saclay / UVSQ)
- Numerical Computing (T. Dufaud – Paris-Saclay / UVSQ)
- Object-Oriented Programming for Scientific Computing (S. Dechaisemartin – IFPEN)
- Internal Architecture of Operating Systems (M. Felsoci – Paris-Saclay / UVSQ)
- Numerical Programming Project
- Technical English

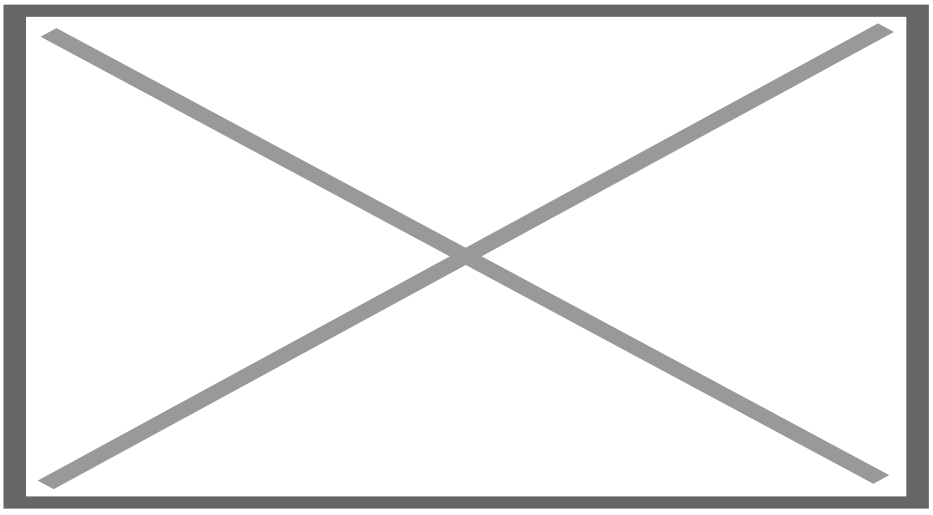
Semester 2

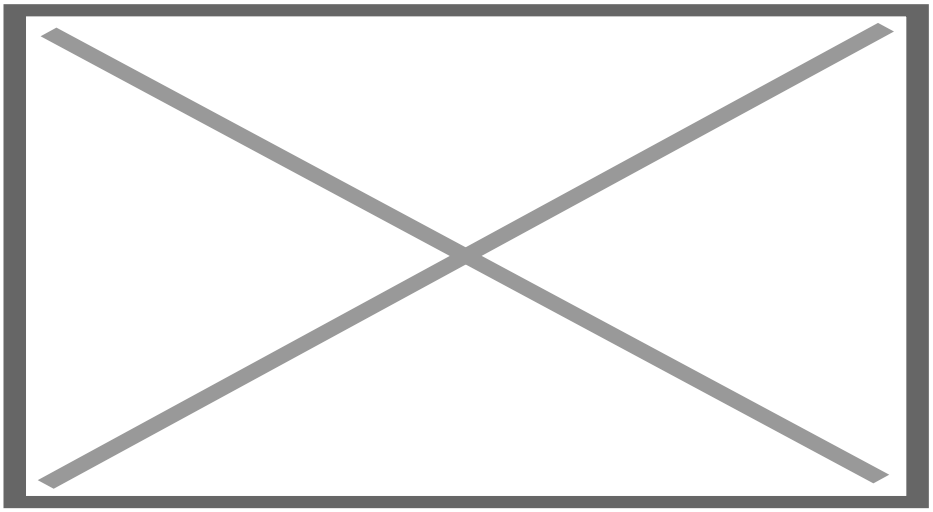
- Distributed Algorithms (G. Manoussakis – Paris-Saclay / UVSQ)
- Algorithms and Parallel Programming (M. Perache – CEA)
- Optimization and Operational Research (D. Sohier – Paris-Saclay / UVSQ)
- Scientific Visualization (J. Redford – Mewlab)
- Modeling Techniques (F. Hafid – ENS Paris-Saclay)
- Parallelization Optimization Techniques (H. Taboada – CEA)
- Parallel Machine Programming Project
- Technical English
- Free TU

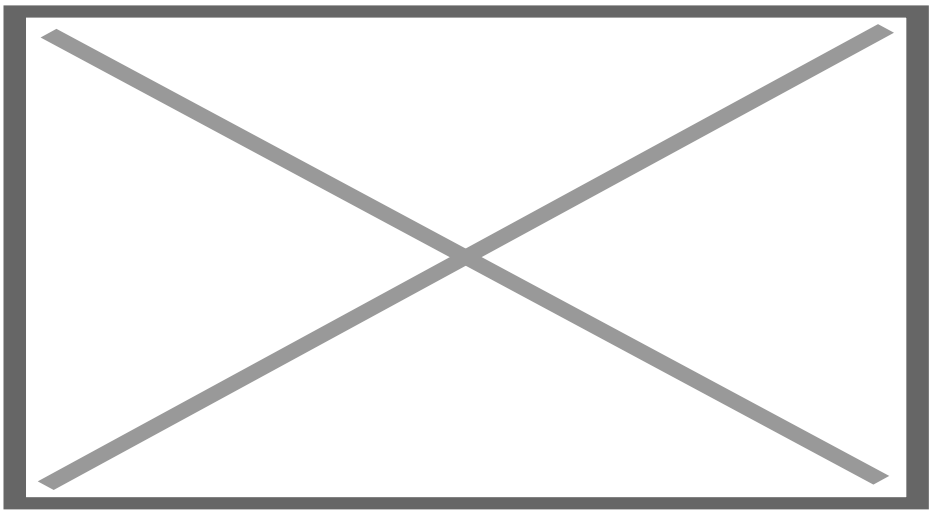
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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

RNCP39279BC01 - Implement advanced and specialized uses of digital tools
RNCP39279BC02 - Mobilize and produce highly specialized knowledge
RNCP39279BC03 - Implement specialized communication for knowledge transfer
RNCP39279BC04 - Contribute to transformation in a professional context
RNCP39279BC05 - Model, formalize, and mathematically solve a problem
RNCP39279BC06 - Analyze, validate, and verify data using mathematical and digital tools
RNCP39279BC07 - Solve complex problems by applying concepts from computer science
RNCP39279BC08 - Solve problems by applying high-performance computing tools

Objectives

The Master's degree in High-Performance Computing and Simulation (CHPS) is a professional and research master's program designed to train high-level scientific professionals capable of mastering three major technological fields: high-performance computing, numerical simulation, and big data analytics. It offers two tracks: High-Performance Computing and Simulation (IHPS) and Modeling and Simulation for High-Performance Computing (MS-CHP). The Master's program is part of the national network of CHPS Master's programs (www.master-chps.fr) and is attached to the Université Paris-Saclay, ranked 1st European university (14th worldwide) in the Shanghai ranking.

Débouchés

Career prospects

Lecturer (after a PhD)
Research Engineer
Research & Development Engineer

Further Study Opportunities

2nd year Master’s
Graduates then have the competencies expected in rapidly evolving sectors such as tech, finance, healthcare and energy.

Calendar

Start of programme (indicative date)
07/09/2026
End of programme (indicative date)
31/08/2027
Admission

Admission Route

Computer Science
Mathematics
Physics

Capacity

Available Places

35

Target Audience and Entry Requirements

This master's program is aimed at students with a degree equivalent to a bachelor's in computer science, mathematics, physics, or mechanics.

Période(s) de candidature

Inception Platform

From 15/01/2026 to 16/03/2026

MonMaster Platform

From February 17th to March 16th, 2026

To find out which platform you should apply through, please see the Masters' applications and enrolment page.

Supporting documents

Compulsory supporting documents

Copy of identity document.

Motivation letter.

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

Curriculum Vitae.

Additional supporting documents

Certificate of French (compulsory for non-French speakers).

Detailed description and hourly volume of courses taken since the beginning of the university program.

Document ou lien décrivant les unités d'enseignement suivies dans la formation d'origine.

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

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 study	Lecture/practical class	directed study/practical class
Fondements mathématiques pour le HPC	2	Semestre 1	9	9				
Charger le détail Calcul numérique	5	Semestre 1	15	27				
Charger le détail Projet de Programmation Numérique	4	Semestre 1						
Charger le détail Programmation Objet pour le calcul scientifique	5	Semestre 1	15	27				
Charger le détail Génie logiciel pour le calcul HPC/IA	4	Semestre 1	15	24				
Charger le détail Architecture Parallèle	5	Semestre 1	15	27				
Charger le détail Anglais Technique 1	2	Semestre 1		15				

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	
Charger le détail									
Architecture Interne des Systèmes d'exploitation	3	Semestre 1	12	18					
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	
Optimisation et Recherche Opérationnelle	3	Semestre 2	12	15					
Charger le détail									
Anglais Technique 2	2	Semestre 2		15					
Charger le détail									
Techniques de Modélisation	3	Semestre 2	12	18					
Charger le détail									
Visualisation scientifique	3	Semestre 2	9	9					
Charger le détail									
Techniques d'optimisation de la parallélisation	3	Semestre 2	12	15					
Charger le détail									
Projet de Programmation sur machine parallèle	4	Semestre 2							
Charger le détail									
Algorithmique et Programmation Parallèle	5	Semestre 2	15	27					
Charger le détail									

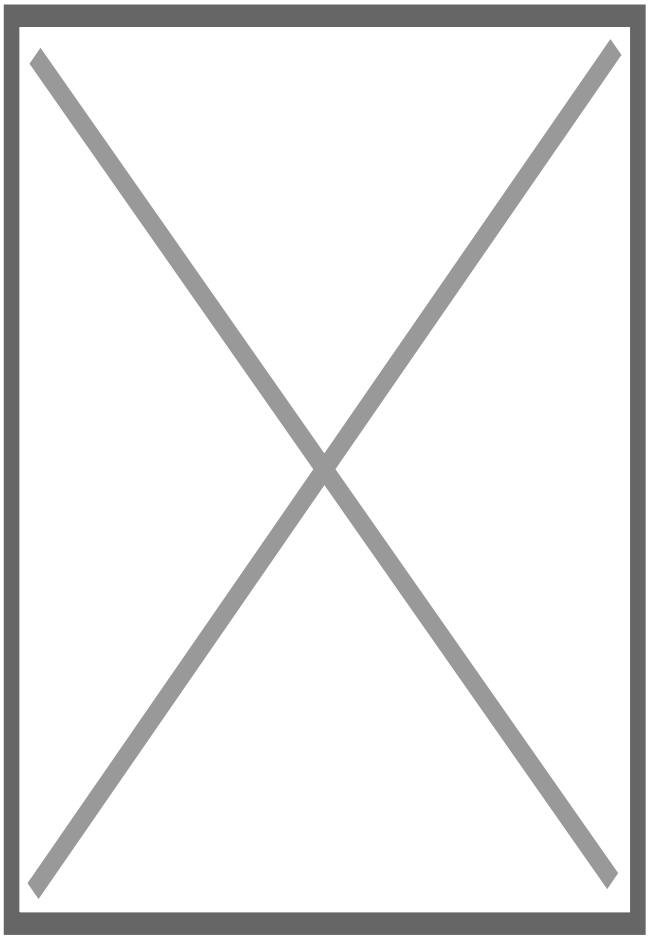
Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	
Algorithmique Distribuée	4	Semestre 2	12	18					
Charger le détail									
UE libre S2	3	Semestre 2							
Charger le détail									

Teaching Location(s)

GUYANCOURT

Training campus

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Saint-Quentin-en-Yvelines

Saint-Quentin-en-Yvelines
Bus 5103, 5150, 5198, 7807
RER C Saint-Quentin-en-Yvelines
Voir
Student restaurant (CROUS)
Student residence
Library

Contact

- **Thomas DUFAUD**
- **Pablo DE OLIVEIRA CASTRO**

http://www.universite-paris-saclay.fr/formation/master/calcul-haute-performance-simulation/m1-calcul-haute-performance-simulation