Université Paris-Saclay
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M2 Mathematics and Artificial Intelligence

Master's degree
Specialisation Mathematics and applications
Language(s) of instruction
English
French

This Master's program "Mathematics and Artificial Intelligence" aims to provide students with a thorough understanding of the theoretical and practical foundations of statistical learning algorithms, and to equip them with the skills necessary for their critical analysis and implementation.

The Master's program "Mathematics and Artificial Intelligence" is jointly offered by the Mathematics Department of Orsay and CentraleSupélec, with support from the Computer Science Department and the SaclAI-school program.

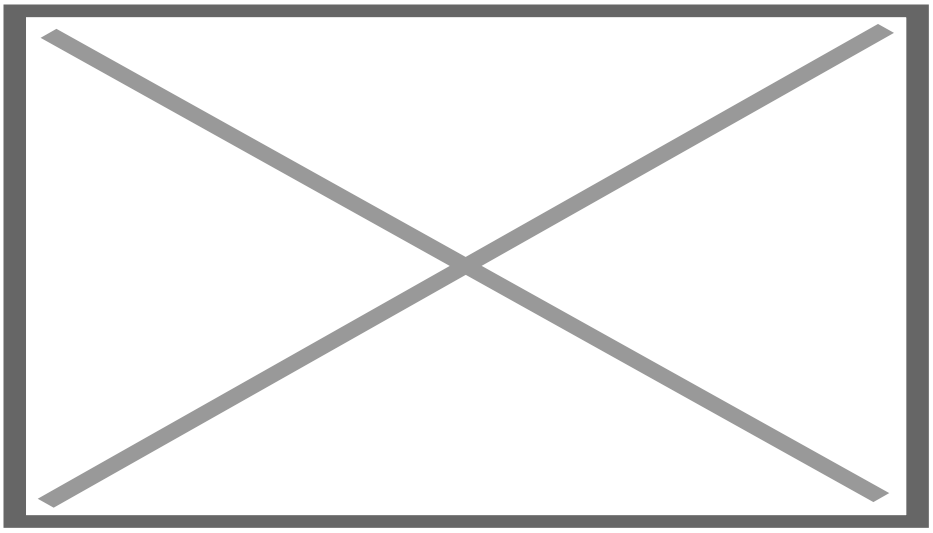
It is structured in three periods (September to early November, early November to mid-January, and mid-January to the end of March). The last part of the year, from early April to the end of September, is dédicated to the internship.

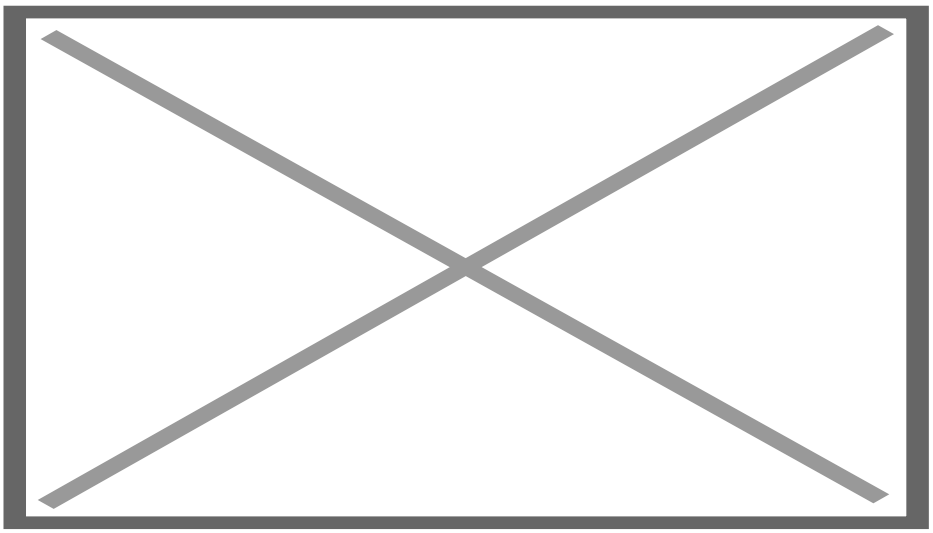
The program offers both mandatory and optional modules. Depending on the modules, classes take place at the mathematics laboratory in Orsay, at CentraleSupélec, or at the computer science laboratory in Paris-Saclay.

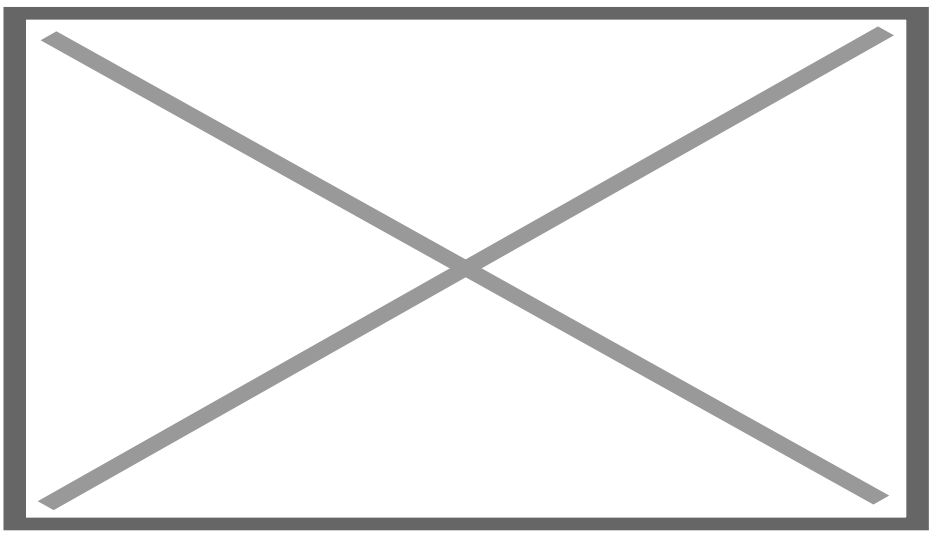
Optional modules are designed to allow students to choose their preferred focus, ranging from a more theoretical, mathematics-oriented program to a more applied one.

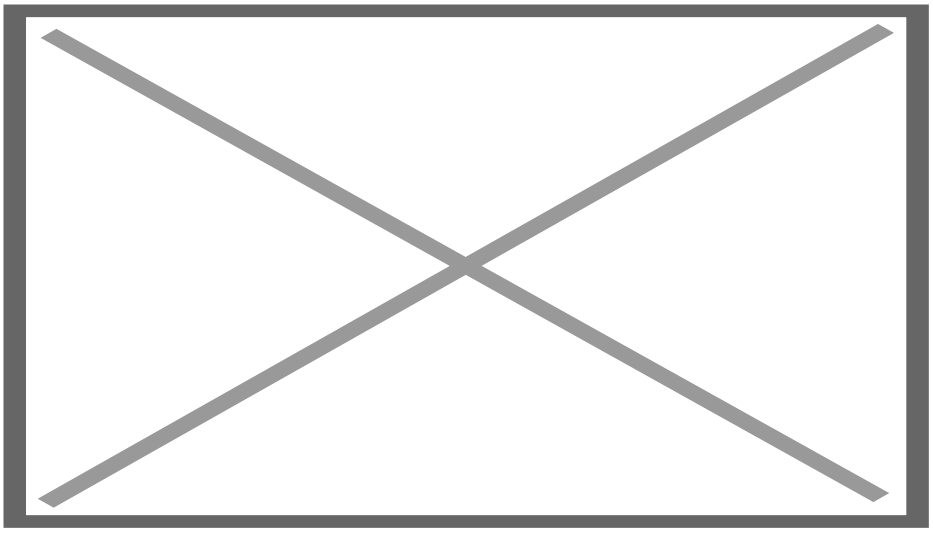
For more information, please visit the website for this Master's program in Mathematics and Artificial Intelligence.

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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

To master and implement advanced mathematical tools and methods, particularly in the context of machine learning and AI.

Objectives

Context. Mathematics plays a crucial role in artificial intelligence (AI), particularly in machine learning. Data science, which combines mathematical modeling, statistics, computer science, data visualization, and applications, aims to move beyond simply storing and disseminating information, focusing instead on knowledge creation. This transition from data to knowledge requires an interdisciplinary approach that relies heavily on statistical data processing (mathematical statistics, computational statistics, and machine learning).

The increasing complexity of data necessitates the use of new tools from various branches of mathematics (functional analysis, numerical analysis, convex and non-convex optimization), which students must learn to understand and apply.

Objectives. This program enables students to master the mathematical concepts and techniques that underlie machine learning, while also providing them with strong computer skills for developing projects in machine learning, data science, and AI. The "Mathematics for Artificial Intelligence" Master's program has a dual

objective:

- to enable students with a broad understanding of a wide range of mathematical tools, methods, and learning algorithms, through courses covering all areas of mathematics and its interfaces with computer science and artificial intelligence.
- To allow students to experience research in mathematics and its applications to artificial intelligence. This includes tackling open-ended research problems, participating in research internships, and completing mini-projects as part of their coursework.

Débouchés

Further Study Opportunities

R&D researcher or data modelling and analysis expert in leading-edge companies or laboratories.
Data Scientist, Data Analyst, Ingénieur·e en Machine Learning dans des secteurs innovants (tech, finance, santé, énergie, etc.) ;
fields of statistical learning, artificial intelligence and advanced data analysis
Engineering, research and development
Poursuite en thèse en apprentissage statistique, mathématiques appliquées ou intelligence artificielle ;

Admission

Capacity

Available Places

30

Target Audience and Entry Requirements

This program is intended for students who have completed an M1 (Master 1) degree in mathematics with a focus on statistics, data science, and computer science skills, or an M1 degree in computer science or artificial intelligence with a strong mathematical foundation.

The program is designed in particular as a continuation of the M1 Mathematics and AI program in Paris-Saclay.

It is specifically tailored for students at CentraleSupélec who have completed the SDI (Data Science and Artificial Intelligence) program, but it can also accommodate students from other engineering schools who have the necessary mathematical prerequisites, for example, during a study break.

Période(s) de candidature

Inception Platform

From 01/04/2026 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

Letter of recommendation or internship evaluation.

A recommendation letter is not mandatory but strongly advisable.

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

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

Recommendation letters.

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	d l
Advanced Supervised Methods and Data Challenge	5	Semester 1	24						
Charger le détail									
Advanced Unsupervised Methods	5	Semester 1	24						
Charger le détail									
Introduction to Reinforcement Learning	5	Semester 1	24						
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	dis lea c
[M2 Inf-AI] Deep Learning for NLP	2.5	Semestre 1	10.5	10.5					
Charger le détail									
High-dimensional Modelling	5	Semester 1	24						
Charger le détail									
[AI] TC4: Probabilistic Generative Models	2.5	Semestre 1	16.5	4.5					
Charger le détail									
[M2 Inf-AI] Speech and Language Processing	2.5	Semestre 2	21						
Charger le détail									
Sequential Learning	5	Semestre 1	24						
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	dis lea c
Introduction to Deep Learning	5	Semester 1	24						
Charger le détail									
Optimization	5	Semester 1	24						
Charger le détail									
Big Data Framework	5	Semester 1	24						
Charger le détail									
Theoretical Foundations of Deep Learning	5	Semester 1	24						
Charger le détail									
Optimization for Computer Vision	5	Semester 1	24						
Charger le détail									
Module d'ouverture	5	Semestre 1							
Charger le détail									
High-dimensional Probability and Statistics	5	Semester 1	24						
Charger le détail									
[M2 Inf-AI] Signal Processing	2.5	Semestre 2							
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c

Sequential Learning, Optimization, and Games	4	Semester 2	20
Charger le détail			
Guidelines in Statistical Learning	4	Semester 2	32
Charger le détail			
Mathematics of generative models	4	Semester 2	24
Charger le détail			
Topological Data Analysis	4	Semester 2	20
Charger le détail			
Advanced Multivariate Data Analysis	4	Semester 2	24
Charger le détail			
Bayesian Statistics and Applications	4	Semester 1	24
Charger le détail			
Statistical Theory of Algorithmic Fairness	4	Semestre 2	24
Charger le détail			
Graphical Models: Discrete Inference and Learning	4	Semester 2	24
Charger le détail			
Geometric Methods in Data Analysis	4	Semester 2	24
Charger le détail			

Module d'ouverture	4	Semestre 2

Charger le détail

Student Seminar	2	Semester 2

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distan learn cour
Internship or Research Project	16	Semester 2							

Charger le détail

Teaching Location(s)

ORSAY
GIF SUR YVETTE
PALAISEAU

Contact

- **Gilles BLANCHARD**

  PR

http://www.universite-paris-saclay.fr/formation/master/mathematiques-et-applications/m2-mathematiques-et-intelligence-artificielle