

DOMAINE SCIENCES, TECHNOLOGIES, SANTE
PROGRAMME PEDAGOGIQUE

MASTER DATA SCIENCE



Contact

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Objectives & future jobs

This Master program in 2y aims at preparing high level scientist for research in a laboratory, possibly by pursuing a PhD program in data science, machine learning, signal processing, etc, or in a company as a research engineer.

All classes are given in English so that foreign students are welcome. A high level in mathematics (probability, statistics, optimization), computer science (algorithmics, programming, data bases) as well as advanced machine learning is targeted.

Most of the teachers are members of [CRISTAL](#) (computer science, automatics and signal processing) or of the laboratory [Paul Painlevé](#) (mathematics). Graduate students will be able to apply for the PhD programs of the best universities in France and abroad.

Application

Since the number of places is limited, candidates are individually selected. The selection committee is aware about the past followed education program, the level of knowledge, internship report, project report, motivations, English and French levels of each candidate.

Candidates are invited to send their application through the dedicated website. Information will be updated on the webpage: <http://www.fil.univ-lille1.fr/portail/mds>

Structure M1 – M2

The structure will permit students to personalize their track, in particular in view of a subsequent PhD program, by choosing appropriate courses.

M1

Each course is made of 24h in presence and typically represents 3 ECTS

M1 - Semester 1

UE 1: Refresher in maths & computer science	EC1: Refresher in maths EC2: Refresher in computer science EC3: Python & tools for research	24h 24h 24h
UE2: Mathematics for data science 1	EC1: Fundamental notions of mathematics EC2: Probability 1 EC3: Statistics 1	24h 24h 24h
UE3: Computer science 1	EC1: Databases 1 EC2: Algorithms and their complexity 1	24h 24h
UE4: Machine learning	EC1: Machine Learning 1, hands on EC2: Machine learning 2, the landscape of machine learning	24h 24h
UE5: Transverse	EC1: Ethics and laws EC2: English or French for foreigners	24h

M1 - Semester 2

UE1: Mathematics for data science 2	EC1: Probability 2 EC2: Statistics 2	24h 24h
UE2: Optimization and algorithms	EC1: Numerical analysis and optimization EC2: Algorithms and their complexity 2	24h 24h
UE3: Machine learning & signal processing	EC1: Models for machine learning EC2: Signal processing	24h 24h
UE4: Applied machine learning	EC1: Deep learning EC2: Data challenge	24h Kaggle
UE5: Data science and its environment	EC1: Research project EC2: Seminars	
UE6: Internship	6 to 14 weeks, laboratory or company	

M2

M2 - Semester 3

UE0: Refreshers (optional)	EC1: Refresher in maths EC2: Refresher in computer science	24h 24h
UE1: Theoretical machine learning	EC1: Theory of machine learning EC2: Kernel machines	24h 24h

UE2: Algorithmics and Databases	EC1: Data bases EC2: Distributed/parallel computing	24h 24h
UE3: Machine learning in practice	EC1: Graphs and networks EC2: Machine learning for signal processing EC3: Advanced methods for inference EC4: Sequential decision making & reinforcement learning	24h 24h 24h 24h
UE4: Research in practice	EC1: Ethics and laws EC2: Reading group EC3: Seminars	24h
UE5: Professional training	EC1: Research project EC2: Data challenge	
UE6: Foreign language	EC1: English / French for foreigners	

M2 - Semester 4

Internship of 4 to 6 months in a laboratory or company + Memoire