DATE2M - Teaching profile

Learning outcomes

Acquérir de solides bases méthodologiques en analyse et traitement de données et les appliquer dans des domaines variés tel que sciences humaines, ingénierie, marketing, finance, assurance ou sciences du vivant...

Au terme de la formation, l'étudiant maîtrisera les concepts fondamentaux en algorithmique, data mining, machine learning,

Programme structure

The 120-credit Master in Data Science programme consists of the following items.

A common curriculum of 46 credits, including a final thesis and teaching units in:

- Databases
- Machine Learning
- Statistics
- A seminar
- Professional integration work.

One focus of 30 credits will be taken among a choice of two:

- The data analytics focus offers a range of algorithmic and statistical methods for data mining, learning, and visualization of large data sets.
- The cybersecurity focus is structured around 5 pillars: cryptography, hardware, software and system security, and privacy, as well as an introduction to information theory.

Elective courses and/or options are chosen so as to reach at least 120 credits.

To the 120-credit programme may be added an additional preparatory module for students who do not have all the prerequisites for the Master. These teaching units will be selected with the study advisor.

DATE2M Programme

Detailed programme by subject

CORE COURSES [46.0]

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Year
1 2

Year
1 2

LEPL2020	Professional integration work *The modules of LEPL2020 course are organized over the two annual blocks of the master's degree. It is strongly recommended that students take them from year 1, but they will only be able to register for the course at the earliest the year in which they present their final graduation project.* *Students who have other professional integration activities in their personal programme, or who can demonstrate an equivalent activity could be exempted from this course. This equivalence is at the discretion of the examination board. Another activity should then be chosen to reach the number of ECTS required for their graduation.*		EN [q1+q2] [30h+15h] [2 Credits] Δ *> French-friendly*

LIST OF FOCUSES

PROFESSIONAL FOCUS : DATA ANALYTICS [30.0]

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
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- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

Content:

				Year 1	Year 2
LDATA2010	Information visualisation	John Lee	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LINMA2472	Algorithms in data science	Jean-Charles Delvenne (coord.) Benoît Legat (compensates Vincent Blondel)	EN [q1] [30h+22.5h] [5 Credits] > French-friendly	x	x
LINFO2364	Mining Patterns in Data	Siegfried Nijssen	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	x
LSTAT2130	Introduction to Bayesian statistics	Philippe Lambert	EN [q2] [22.5h+7.5h] [5 Credits]	x	x
LINFO2275	Data mining & decision making	Marco Saerens	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	

				Year 1	2
LINFO2347	Computer system security	Ramin Sadre	EN [q2] [30h+15h] [5 Credits] > *French-friendly*	x	x
LINFO2144	Secured systems engineering	Charles-Henry Bertrand Van Ouytsel Gaëtan Cassiers	EN [q2] [30h+15h] [5 Credits] > *French-friendly*	x	x
LMAT2450	Cryptography	Olivier Pereira	EN [q1] [30h+15h] [5 Credits] > *French-friendly*	x	x
LELEC2348	Information theory and coding				

				Year 1	2
LINFO2241	Architecture and performance of computer systems	Tom Barbette	EN [q1] [30h+30h] [6 Credits] *> French-friendly*	x	x

Elective courses

LINFO2347	Computer system security	Ramin Sadre	EN [q2] [30h+15h] [5 Credits] *> French-friendly*	x	x
LINFO2143	Concurrent systems : models and analysis	Charles Pecheur	EN [q1] [30h+15h] [5 Credits] *> French-friendly*	x	x
LINFO2349	Networking and security seminar	Etienne Riviere Ramin Sadre	EN [q1] [30h] [3 Credits] *> French-friendly*	x	x

MAJOR IN NUMERICAL METHODS AND OPTIMISATION

- Mandatory
- Optional
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- Not offered in 2024-2025 or the following year
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- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

The student who wishes to validate this option chooses 15 credits among:

	Year	
	1	2

Content:

ELECTIVE TECHNICAL COURSES

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

Click on the course title to see detailed informations (objectives, methods, evaluation...)

OPTIONS ET COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES [3.0]

BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students

MAJOR IN INTERDISCIPLINARY PROGRAM IN ENTREPRENEURSHIP - INEO

COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

OTHERS ELECTIVE COURSES

Supplementary classes

To access this Master, students must have a good command of certain subjects. If this is not the case, in the first annual block of their Masters programme, students must take supplementary classes chosen by the faculty to satisfy course prerequisites.

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
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- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, 1r

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			degree may have an adapted master programme.
Bachelor in Engineering	For others institutions	Access based on application	See "Personalized access"

Non university Bachelors

> Find out more about links to the university

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
Masters			
Master ingénieur civil		Direct access	
Master [120] ingénieur civil en science des données, deuxième finalité		Direct access	Au terme du master 120, chaque finalité du Master [120] ingénieur civil en science des données peut être obtenue dans un nouveau programme de 30 crédits seulement.

Holders of a non-University 2nd cycle degree

Access based on validation of professional experience

> It is possible, under certain conditions, to use one's personal and professional experience to enter a university course without having the required qualifications. However, validation of prior experience does not automatically apply to all courses. Find out more about Requirements

Teaching method

Active learning and soft skills

You will play an active role in your training. The teaching approach is a balanced mix of lectures, exercises, projects to be carried out alone or in groups. The teaching methods are varied. At certain times, you will be led to discover concepts or techniques independently, and the teaching staff is then seen as a resource made available to you to support your learning.

At other times, the pedagogy is more transmissive and provides you with the necessary keys to carry out subsequent tasks. An important place is reserved for non-technical skills (autonomy, organisational skills, time management, communication in different modes, etc.). In particular, through a pedagogy that emphasises project activities (including a large-scale project that puts groups of students in a semi-professional situation), the course develops a critical mind capable of designing, modelling, implementing and validating complex computer systems.

Languages

The lingua franca of data science is mainly English. The use of English throughout the programme allows you to develop your command of this language, which will facilitate your professional integration. Course materials and supervision are in English. However, you can always ask questions or take the exam in French if you wish. In addition, the programme offers the possibility of attending extra language courses and participating in exchange programmes abroad.

Interdisciplinarity

Like many academics, the data scientist will be required to manage projects and a team in the course of his or her career, and will have to take an interest in the complex socio-economic context in which data science is embedded. You will therefore be invited to open up your training to other disciplines via elective courses or certain options such as the option "interdisciplinary program in entrepreneurship".

Evaluation

The evaluation methods comply with the regulations concerning studies and exams. More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".

Each unit of the programme includes an oral or written examination, often supplemented by a project leading to a report which is part of the assessment. The optional internship and the master thesis each involve the writing of a document which is defended orally before a jury.