UCLouvain

DATI2M

2026 - 2027

Master [120] in Data Science: Information Technology

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In English
Dissertation/Graduation Project : **YES** - Internship : **optional**
Activities in English: **YES** - Activities in other languages : **optional**
Activities on other sites : **NO**
Main study domain : **Sciences**
Organized by: **Louvain School of Engineering (EPL)**
Programme acronym: **DATI2M** - Francophone Certification Framework: 7

Table of contents

Introduction 2
Teaching profile 3
Learning outcomes 3
Programme structure 4
Programme 4
Detailed programme by subject 4
Supplementary classes 16
Course prerequisites 18
The programme's courses and learning outcomes 18
Information 19
Access Requirements 19
Teaching method 22
Evaluation 22
Mobility and/or Internationalisation outlook 22
Possible trainings at the end of the programme 22
Contacts 23

DATI2M - Introduction

Introduction

Introduction

The digitisation of society has led to considerable increase in the volume of data available. As a result, most of society's stakeholders now rely heavily on this data to help them make objective decisions and develop their areas of expertise. These specific needs have resulted in the emergence of **new data-oriented careers.**

The Civil Engineering Master in Data Science offers training in **scientific methods and technology tools** to answer societal or scientific questions based on **the processing of often massive data** ("Big Data"). This discipline generally involves combining structured modelling of the problem of interest with computer science, statistics and mathematics to provide a rigorous, quantitative and operational solution to the question posed.

An IT infrastructure and complex calculation algorithms also complement these scientific methods to enable the data to be structured and processed.

Finally, cybersecurity has become an essential element in a data-centric world: it involves understanding and being able to manage the risks associated with the data itself, as well as being able to protect stored data and circulate it securely.

The **areas of application** of data science are extremely varied: political and security decision-making, e-commerce, network data processing, financial and industrial production data processing, natural langage processing, biomedical research based on microbiological or imaging data and more.

Your profile

You have completed a bachelor's or master's degree in which you have gained solid skills and an appreciation of the three fundamental pillars of data science - mathematics, statistics and computer science - as well as an interest in the fields in which these disciplines are applied.

You have a good command of technical English and are able to follow lectures, read scientific literature, write reports and express yourself orally in this language. You have the general skills and personal qualities necessary for a scientific master's degree, namely, autonomy, critical thinking, rigour, self-learning capacity and the ability to search and process information.

An additional teaching block (of maximum 60 credits) may be offered to students who lack some of these skills.

Your future job

Your degree in data science will prepare you for positions as a data scientist, data analyst, security analyst, data and analytics manager, data engineer, security engineer or security architect, and will prepare you to take on responsabilities in these fields.

Your programme

UCLouvain civil engineering master's programme in Data Science : Information Technology is based on a core curriculum that provides a technical foundation in the fields of learning theory, databases, and linear statistical models.

This core curriculum is complemented by a specialisation in data analysis or cybersecurity :

- The data analysis major offers a range of algorithms and statistical methods for data mining, learning, and visualisation of large datasets.
- The cybersecurity major is built around five pillars: cryptography, privacy, and hardware, software and system security, as well as an introduction to information theory.

These specialisations are completed by options and elective courses that allow students to deepen their knowledge of algorithms, computer science, statistics, applications or entrepreneurship.

Your parcours

You will primarily develop solid, in-depth, cross-disciplinary skills to be able to address a broad spectrum of data science and cybersecurity problems and to carry out projects or develop research in the field.

Your programme will offer you opportunities to explore, through projects, internships or applied courses, the extremely varied fields of application of data science.

DATI2M - Teaching profile

Learning outcomes

The programme will provide students with a strong methodological foundation in data analysis, processing and security, which they will be able to apply in a variety of fields, including the social sciences, engineering, marketing, finance, insurance and life sciences…
Students will acquire the knowledge and develop the skills needed to:

- become data analysis experts

1. Data Analysis (DA) (range of algorithms and statistical methods, for data mining, learning and visualisation of large datasets, electronics, mechanical production, automation and robotics) or cybersecurity experts
2. Cybersecurity (CS) (cryptography, hardware, software and computer system security, privacy, introduction to information theory)

- communicate efficiently
- analyse complex problems
- collaborate on research projects.

On successful completion of this programme, each student is able to :

1. Master an extensive body of knowledge in data science (AD discipline) or data security (CS discipline), enabling them to solve problems in their discipline

1.1. Data structures and algorithms for data analysis.
1.2. Learning theories, data mining and visualisation of large-scale data.
1.3. Statistical inference, modelling and statistical computing.
1.4. Industrial and entrepreneurial aspects of data science. Students majoring in information technology will specialise in one option.
1.5 Software, hardware and cryptographic aspects of data security.
1.6 Computer systems, including distributed computing, embedded computing, networks and security (optional courses).
1.7 Digital methods and optimisation, including constraint programming, operational research, identification and applied mathematics (optional courses).

2. Organise and complete the development of a data security and operating system to meet the generally complex needs of a customer

2.1. Analyse the problem to be solved or the functional requirements to be met and formulate the corresponding specifications.
2.2. Format and model a problem and design one or more original technical solutions to meet the specifications.
2.3 Evaluate and classify solutions in light of all the criteria included in the product specifications: efficiency, feasibility, quality, ergonomics, security and environmental and social sustainability.
2.4 Implement, test and validate the chosen solution and interpret the results.
2.5. Make recommendations to improve the operational nature of the solution.

3. Organise and complete a research project to tackle new challenges linked to the use and security of data using a new methodology or in a new environment

3.1 Research and summarise current knowledge in the relevant field.
3.2. Come up with a model and/or an experimental set-up making it possible to simulate and test hypotheses relating to the problem being studied.
3.3 Produce a summary report that thoroughly describes the methodology and explains the potential for theoretical and/or technical innovation resulting from this research work.
3.4 Think disruptively and creatively, open to plurality.

4. Contribute as part of a team to the management of a data exploitation and security project and see it through to completion, taking into account the objectives, allocated resources and constraints involved.

4.1. Frame and explain the objectives of a project (including performance indicators), taking into account the issues and constraints (resources, budget, deadlines, standards, regulations, particularly environmental regulations, etc.) that characterise the project environment.
4.2. Make a collective commitment to a work plan, a timetable and the roles to be played.
4.3. Operate in a multi/inter/transdisciplinary environment with individuals who hold different points of view, identify the contributions and limits of each discipline, dialogue on the same project.
4.4. Take decisions as part of a team when choices have to be made: whether on technical solutions or on the organisation of work to bring the project to a successful conclusion.

5. Communicate effectively orally and in writing with a view to successfully completing the projects entrusted to him/her in his/her working environment (particularly in English)

5.1 Clearly identify the needs of the customer or user: ask questions, listen and understand all aspects of their request, not just the technical aspects.

5.2. Argue and convince by adapting to the language of the people you are dealing with: technicians, colleagues, customers, superiors, specialists from other disciplines or general public.

5.3. Communicate graphically and schematically; interpret a diagram, present the results of work, structure information.

5.4. Read, analyse and use technical documents (diagrams, manuals, specifications, etc.).

5.5. Draft written documents, taking account of contextual requirements and social conventions in the field.

5.6. Give a convincing oral presentation using modern communication techniques.

6. Rigorously mobilise their scientific and technical skills and their critical sense to analyse complex situations by adopting a systemic and transdisciplinary approach, and to adapt their technical responses to the current and future challenges of the socio-economic-ecological transition, thus actively contributing to the transformation of society

6.1. Acquire a knowledge base on the socio-ecological issues and use multi-criteria tools to evaluate the sustainability of a technology, in quantitative and/or qualitative terms.

6.2. Define, specify and analyse a problem in all its complexity, taking into account its various dimensions (social, ethical, environmental, etc.), scales (time, place) and uncertainty.

6.3. Identify, propose and activate engineering levers that can contribute to sustainable development and transition (eco-design, robustness, circularity, energy efficiency, etc.).

6.4. Demonstrate critical awareness of a technical solution to verify its robustness and minimise the risks that may occur during implementation, be aware of its limitations, and take a personal stand on ethical, environmental and societal issues.

6.5. Evaluate oneself and independently develop necessary skills to remain knowledgeable in the field.

Programme structure

The 120-credit master's programme in Data Science is made up of :

- A common curriculum of 44 credits, including a final thesis and teaching units in:
  - Databases
  - Machine Learning
  - Statistics
  - A seminar
- One professional focus of 30 credits, among:
  - The data analytics focus offers a range of algorithmic and statistical methods for data mining, learning, and visualisation of large datasets.
  - The cybersecurity focus is built around 5 pillars: cryptography, hardware, software and system security, and privacy, complemented by an introduction to information theory.
- Elective courses and/or options are selected to earn at least 120 credits.

An additional teaching module may be added to the 120-credit programme for students who do not have all the prerequisites for the master's degree. These teaching units will be selected in consultation with the student advisor.

DATI2M Programme

Detailed programme by subject

CORE COURSES [44.0]

O Mandatory
⊠ Optional
△ Not offered in 2026-2027
⊘ Not offered in 2026-2027 but offered the following year
⊕ Offered in 2026-2027 but not the following year
△ ⊕ Not offered in 2026-2027 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
LDATI2990	Master thesis *The graduation project can be written and presented in French or English, in consultation with the supervisor. It may be accessible to exchange students by prior agreement between the supervisors and/or the two universities.*		EN [q1+q2] [] [25 Credits] *> French-friendly*	x	x
LINFO2172	Databases	Samuel Hiard	EN [q2] [30h+30h] [6 Credits] *> French-friendly*	x	x
LSTAT2120	Linear models	Christian Hafner	EN [q1] [30h+15h] [5 Credits] *> French-friendly*	x	x
LINFO2262	Machine Learning :classification and evaluation	Pierre Dupont	EN [q2] [30h+30h] [5 Credits] *> French-friendly*	x	x

One course to choose from

LINFO2399	Industrial seminar in computer science	Yves Deville Bernard Geubelle	EN [q2] [30h] [3 Credits] *> French-friendly*	x	x
LINFO2369	Artificial intelligence and machine learning seminar	Quentin Cappart Eric Piette Hélène Verhaeghe (coord.)	EN [q1] [30h] [3 Credits] *> French-friendly*	x	x
LINMA2120	Applied mathematics seminar	Pierre-Antoine Absil Frédéric Crevecoeur Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers (coord.) Geovani Nunes Grapiglia	EN [q1+q2] [15h] [3 Credits] *> French-friendly*	x	x
LSTAT2390	Applied statistics workshops	Christian Ritter Christian Ritter (compensates Laura Symul)	EN [q1+q2] [15h] [3 Credits] *> French-friendly*	x	x

LIST OF FOCUSES

> Professional Focus : Data Analytics [en-prog-2026-dati2m-ldati210s]
> Professional Focus : Cybersecurity [en-prog-2026-dati2m-ldati220s]

PROFESSIONAL FOCUS : DATA ANALYTICS [30.0]

- O Mandatory
- ⊠ Optional
- △ Not offered in 2026-2027
- ⊘ Not offered in 2026-2027 but offered the following year
- ⊕ Offered in 2026-2027 but not the following year
- △ ⊕ Not offered in 2026-2027 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...)

Content:

				Year 1	Year 2
O LINMA2472	Algorithms in data science	Vincent Blondel Benoît Legat	EN [q1] [30h+22.5h] [5 Credits] > French-friendly	x	x
O LINFO2364	Mining Patterns in Data	Hélène Verhaeghe	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	x
O LSTAT2130	Introduction to Bayesian statistics	Philippe Lambert	EN [q2] [22.5h+7.5h] [5 Credits]	x	x
O LINFO2275	Reinforcement Learning: Algorithms and Applications	Quentin Cappart Eric Piette	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	x
O LELEC2870	Machine learning : regression, deep networks and dimensionality reduction	John Lee Michel Verleysen	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
O LDACS2210	Information visualisation	John Lee	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x

PROFESSIONAL FOCUS : CYBERSECURITY [30.0]

- O Mandatory
- ⊠ Optional
- △ Not offered in 2026-2027
- ⊘ Not offered in 2026-2027 but offered the following year
- ⊕ Offered in 2026-2027 but not the following year
- △ ⊕ Not offered in 2026-2027 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...)

Content:

				Year 1	Year 2
O LELEC2760	Secure electronic circuits and systems	François-Xavier Standaert	EN [q2] [30h+30h] [5 Credits] > French-friendly	x	x
O LELEC2770	Privacy Enhancing technology	Olivier Pereira François-Xavier Standaert	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
O LINFO2347	Computer system security	Ramin Sadre	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	x

				Year 1	Year 2
LINFO2144	Secured systems engineering	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	Jérôme Louveaux Benoît Macq Olivier Pereira	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	x

OPTIONS

A minimum of 90 credits must be obtained in each discipline (taught in the EPL or STAT Masters, including the TFE), not including additional credits taken by students who do not have the minimum foundation requirements.
Choosing an option is not compulsory.
In the "Options and Elective Courses in Socioeconomic Knowledge" section, students must either validate one of the two options or select a minimum of 6 credits from the elective courses within the “Business Risks & Opportunities” option (maximum one innovation class may be chosen, maximum one course among those offered by the CPs may be taken into account in these 6 credits).

Majors in Data Science: Information technology

> Major in computer systems *[en-prog-2026-dati2m-ldati220o]*
> Major in numerical methods and optimisation *[en-prog-2026-dati2m-ldati221o]*
> Elective technical courses *[en-prog-2026-dati2m-ldati237o]*

Options and elective courses in socio-economic knowledge

> Major in Business risks and opportunities *[en-prog-2026-dati2m-ldati231o]*
> Major in Interdisciplinary Program in Entrepreneurship - INEO *[en-prog-2026-dati2m-ldati232o]*
> Elective courses in socio-economic knowledge *[en-prog-2026-dati2m-lepl200o]*

Others elective courses

> Others elective courses *[en-prog-2026-dati2m-ldati223o]*

MAJORS IN DATA SCIENCE: INFORMATION TECHNOLOGY

MAJOR IN COMPUTER SYSTEMS

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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...)

Students wishing to validate this option must select a minimum of 16 credits among:

				Year 1	Year 2

Content:

Compulsory courses :

LINFO2145	Cloud Computing	Etienne Riviere	EN [q1] [30h+15h] [5 Credits] > French-friendly	x	x

				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	Tom Barbette Cristel Pelsser Etienne Riviere Ramin Sadre (coord.)	EN [q1] [30h] [3 Credits] > *French-friendly*	x	x
LINFO2146	Mobile and Embedded Computing	Ramin Sadre	EN [q2] [30h+15h] [5 Credits] > *French-friendly*	x	x
LINFO2355	Multicore programming	Tom Barbette	EN [q2] [30h+15h] [5 Credits] > *French-friendly*	x	x

MAJOR IN NUMERICAL METHODS AND OPTIMISATION

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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...)

Students wishing to validate this option must select a minimum of 15 credits among:

Content:

				Year 1	Year 2
Compulsory courses					
LINMA2471	Optimization models and methods II	François Glineur Geovani Nunes Grapiglia	EN [q1] [30h+22.5h] [5 Credits] > French-friendly	x	x
LINMA2380	Algebraic and Combinatorial Techniques for Computing	Raphaël Jungers Jean-François Remacle	EN [q1] [30h+22.5h] [5 Credits] > French-friendly	x	x
One course between					
LINFO2266	Advanced Algorithms for Optimization	Pierre Schaus	EN [q1] [30h+15h] [5 Credits] > French-friendly	x	x
LINMA2450	Combinatorial optimization	Julien Hendrickx Geovani Nunes Grapiglia	EN [q1] [30h+22.5h] [5 Credits] > French-friendly	x	x
Elective courses					
LINMA2470	Stochastic modelling	Philippe Chevalier Quentin Lété	EN [q2] [30h+22.5h] [5 Credits] > French-friendly	x	x
LINMA2491	Operational Research	Quentin Lété	EN [q2] [30h+22.5h] [5 Credits] > French-friendly	x	x
LINMA2171	Numerical Analysis : Approximation, Interpolation, Integration	Pierre-Antoine Absil	EN [q1] [30h+22.5h] [5 Credits] > French-friendly	x	x
LINMA2875	System Identification	Gianluca Bianchin	EN [q2] [30h+30h] [5 Credits] > French-friendly	x	x
LINFO2365	Constraint programming	Pierre Schaus	EN [q2] [30h+15h] [5 Credits] > French-friendly	x	x
LINMA2460	Optimization : Nonlinear programming	Geovani Nunes Grapiglia	EN [q2] [30h+22.5h] [5 Credits] > French-friendly	x	x
LINMA2120	Applied mathematics seminar	Pierre-Antoine Absil Frédéric Crevecoeur Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers (coord.) Geovani Nunes Grapiglia	EN [q1+q2] [15h] [3 Credits] > French-friendly	x	x
LINMA2360	Project in mathematical engineering	Pierre-Antoine Absil Laurent Jacques	EN [q1+q2] [30h+22.5h] [5 Credits] > French-friendly	x	x

ELECTIVE TECHNICAL COURSES

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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...)

Content:

				Year 1	Year 2
Statistics					
LSTAT2380	Statistical consulting	Christian Ritter	EN [q2] [22.5h+7.5h] [5 Credits] > French-friendly	x	x
LSTAT2390	Applied statistics workshops	Christian Ritter Christian Ritter (compensates Laura Symul)	EN [q1+q2] [15h] [3 Credits] > French-friendly	x	x
LSTAT2150	Smoothing techniques	Anna Kiriliouk	EN [q1] [22.5h+9.5h] [4 Credits]	x	x
LDATS2450	Statistical learning. Estimation, selection and inference	Eugen Pircalabelu	EN [q2] [30h+7.5h] [5 Credits] > French-friendly	x	x
Machine learning, vision and artificial intelligence					
LELEC2885	Image processing and computer vision	Christophe De Vleeschouwer Laurent Jacques	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LGBIO2010	Bioinformatics	Vincent Branders (compensates Pierre Dupont)	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LINFO2263	Computational Linguistics and Generative AI	Pierre Dupont	EN [q1] [30h+15h] [5 Credits] > French-friendly	x	x
LINFO2369	Artificial intelligence and machine learning seminar	Quentin Cappart Eric Piette Hélène Verhaeghe (coord.)	EN [q1] [30h] [3 Credits] > French-friendly	x	x
LINFO2381	Health Informatics	Sébastien Jodogne	EN [q2] [30h+30h] [5 Credits] > French-friendly	x	x
Data structures and algorithms for data analysis					
LINFO2345	Languages and algorithms for distributed Applications	Etienne Riviere	EN [q1] [30h+15h] [5 Credits] > French-friendly	x	x
LELEC2770	Privacy Enhancing technology	Olivier Pereira François-Xavier Standaert	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LINFO1361	Artificial intelligence	Quentin Cappart Eric Piette	EN [q2] [30h+30h] [5 Credits]	x	x

OPTIONS AND ELECTIVE COURSES IN SOCIO-ECONOMIC KNOWLEDGE [3.0]

MAJOR IN BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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...)

Students whishing to validate this option must select a minimum of 15 credits among the courses offered (maximum one course among those offered by the CPs can be taken into account in these 15 credits).

This option cannot be taken simultaneously with the "Interdisciplinary training in entrepreneurship - INEO" option.

Content:

Cours spécifiques aux enjeux de l'entreprise

				Year 1	Year 2
LFSA2995	Company Internship *This course cannot be chosen by GCE Masters students as part of the business issues option, as part of their compulsory courses.*	Dimitri Lederer Jean-Pierre Raskin	EN [q1+q2] [30h] [10 Credits]	x	x
LEPL1805	People management *This course cannot be chosen if it has already been validated in the bachelor's degree.*	Bauduin Auquier Philippe Henrotaux Renaud Ronsse	FR [q1] [30h+0h] [3 Credits]	x	x
LEPL2020	Professional integration work	Jean-Pierre Raskin	EN [q1+q2] [30h+0h] [3 Credits] *> French-friendly*		x
LEPL2210	Ethics and ICT	Axel Gosseries Olivier Pereira	EN [q2] [30h] [3 Credits] *> French-friendly*	x	x
LEPL2211	Introduction to new venture management	Benoît Gailly	EN [q2] [30h] [3 Credits] *> French-friendly*	x	x
LEPL2214A	Law, Regulation and Legal Context - (partim A)	Vincent Cassiers Werner Derycke	FR [q1] [30h+0h] [3 Credits]	x	x
LMECA2645	Major technological hazards in industrial activity.	Aude Simar	FR [q2] [30h] [3 Credits]	x	x
LMECA2711	Quality management and control.	Alexandre Debatty Laurence Guiot (coord.)	EN [q2] [30h+30h] [5 Credits] *> French-friendly*	x	x
LLSMS2036	Supply Chain Procurement	Per Joakim Agrell Michael Henke	EN [q1] [30h] [5 Credits]	x	x

Innovation classe

Maximum one innovation class can be chosen.

LEPL2021	Innovation classes for transition and sustainable development	Benoît Macq Xavier Marichal	EN [q1] [30h+15h] [5 Credits]	x	x
LEPL2022	Health Innovation Classes	Pierre Geens Enrique Ignacio Germany Morrison	EN [q2] [30h+30h] [5 Credits] *> French-friendly*	x	x

Courses offered by the Program Commission

LSTAT2380	Statistical consulting	Christian Ritter	EN [q2] [22.5h+7.5h] [5 Credits] *> French-friendly*	x	x
LSTAT2390	Applied statistics workshops	Christian Ritter Christian Ritter (compensates Laura Symul)	EN [q1+q2] [15h] [3 Credits] *> French-friendly*	x	x
LINMA2360	Project in mathematical engineering	Pierre-Antoine Absil Laurent Jacques	EN [q1+q2] [30h+22.5h] [5 Credits] *> French-friendly*	x	x

				Year 1	2
⊠ LINMA2120	Applied mathematics seminar	Pierre-Antoine Absil Frédéric Crevecoeur Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers (coord.) Geovani Nunes Grapiglia	EN [q1+q2] [15h] [3 Credits] *> French-friendly*	x	x
⊠ LACTU2170	Financial valuation of actuarial liabilities	Donatien Hainaut	FR [q2] [45h+15h] [7 Credits]	x	x
⊠ LACTU2030	Life insurance actuarial science	Donatien Hainaut	FR [q1] [30h+7.5h] [5 Credits]	x	x
⊠ LLSMS2034	Supply Chain Planning	Daniele Catanzaro Mathieu Van Vyve	EN [q2] [30h] [5 Credits]	x	x
⊠ LINFO2399	Industrial seminar in computer science	Yves Deville Bernard Geubelle	EN [q2] [30h] [3 Credits] *> French-friendly*	x	x
⊠ LINFO2402	Open Source Project	Cristel Pelsser (coord.)	EN [q1+q2] [0h] [5 Credits] *> French-friendly*	x	x

MAJOR IN INTERDISCIPLINARY PROGRAM IN ENTREPRENEURSHIP - INEO

The aim of this option, which is common to most EPL masters' programmes, is to familiarise students with the specifics of entrepreneurship and business creation, equipping them with the skills, knowledge, and tools necessary for starting a business.

The interdisciplinary entrepreneurship training (INEO) is an option that spans two years and is integrated into over 30 Master's programmes across 9 faculties/schools at UCLouvain.

Choosing the INEO option requires completing an interfaculty dissertation (in teams) focused on a business creation project. Access to this option, as well as to each of its courses, is limited to students selected based on their application.

Full details are available at https://uclouvain.be/fr/etudier/ineo .

Students who choose this option must select a minimum of 20 credits and a maximum of 25 credits. This option is not available in English and cannot be taken simultaneously with the "Business Risks and Opportunity" option.

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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...)

Content:

Cours obligatoires:

				Year 1	Year 2
LINEO2001	Théorie de l'entrepreneuriat	Frank Janssen	[FR] [q1] [30h+20h] [5 Credits]	x	
LINEO2002	Aspects juridiques, économiques et managériaux de la création d'entreprise	Yves De Cordt Emilie Lubukayi Tshibuabua Ngalula	[FR] [q1] [30h+15h] [5 Credits]	x	
LINEO2003	Plan d'affaires et étapes-clefs de la création d'entreprise *Les séances du cours LINEO2003 sont réparties sur les deux blocs annuels du master. L'étudiant doit les suivre dès le bloc annuel 1, mais ne pourra inscrire le cours que dans son programme de bloc annuel 2.*	Frank Janssen	[FR] [q2] [30h+15h] [5 Credits]		x
LINEO2004	Séminaire d'approfondissement en entrepreneuriat	Frank Janssen	[FR] [q2] [30h+15h] [5 Credits]	x	

Cours préalable:

Student who have not taken management courses during their previous studies must enroll in LINEO2021.

LINEO2021	Financer son projet	Olivier Vercruysse	[FR] [q2] [30h+15h] [5 Credits]	x	

ELECTIVE COURSES IN SOCIO-ECONOMIC KNOWLEDGE

Within the section "Options and elective courses in socio-economic knowledge", students must either validate one of the two options or are required to select at least 6 ECTS credits from the courses offered within the "Major in Business risks and opportunities" (a maximum of one Innovation Class may be selected, and a maximum of one course offered by the CPs may be counted towards these 6 credits).

OTHERS ELECTIVE COURSES

The elective courses recommended for students of the Master in Civil Engineering in Data Science (DATE2M) or the Master in Data Science, Information Technology Orientation (DATI2M) are listed above, in the options and other lists of elective courses.
Students are also free to register for other courses in the EPL's master's programmes that may be relevant to their personal career path, provided that they comply with the rules governing the constitution of the master's programme. These courses must be approved by the select committee.

OTHERS ELECTIVE COURSES

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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

Content:

The elective courses recommended and available for students enrolled in the Master's in Data Science Engineering or Master's in Data Science programmes are listed above, in the options and other elective course lists. Students are also free to propose other courses from the EPL Master's programmes that are relevant to their personal background, provided that this complies with the rules for setting up the Master's programme. These courses must be approved by the selection panel.

Languages

Students may select from any language course offered at the ILV. Special attention is placed on the following seminars in professional development:

LALLE2500	Professional development seminar German	Antje Hennig-Wübbenhorst Mélanie Mottin (coord.)	DE [q1+q2] [30h] [3 Credits]	x	x
LALLE2501	Professional development seminar-German	Antje Hennig-Wübbenhorst Mélanie Mottin (coord.)	DE [q1+q2] [30h] [5 Credits]	x	x
LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	ES [q1] [45h] [3 Credits]	x	x
LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	ES [q1] [45h] [5 Credits]	x	x
LNEER2500	Seminar of Entry to professional life in Dutch - Intermediate level	Isabelle Demeulenaere (coord.)	NL [q1 or q2] [30h] [3 Credits]	x	x
LNEER2600	Seminar of entry to professional life in Dutch - Upper-Intermediate level	Isabelle Demeulenaere (coord.) Dag Houdmont	NL [q1 or q2] [30h] [3 Credits]	x	x

Group dynamics

LEPL2351	Become a tutor	Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoen	FR [q1] [15h+30h] [3 Credits]	x	x
LEPL2352	Become a tutor	Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoen	FR [q2] [15h+30h] [3 Credits]	x	x

Year
1 2

⊠ Autres UEs hors-EPL

Students may choose a maximum of 8 credits from courses outside the EPL, which are considered non-disciplinary by the programme committee.

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.

To enter the Master in Data Science, Information Technology orientation, the student must have a minimum of previous skills in mathematics, computer science, algorithms and probability-statistics. If this is not the case, he/she must add additional courses to his/her Master's program. The content of this additional training is determined by the program commission. The skills to be mastered correspond to those of the following courses:

- Mandatory
- Optional
- Not offered in 2026-2027
- Not offered in 2026-2027 but offered the following year
- Offered in 2026-2027 but not the following year
- Not offered in 2026-2027 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...)

Mathematics - Calculus and linear algebra

Students follow one of the following blocks:

Module 1

LINFO1111	Analysis	Pierre-Antoine Absil François Glineur	FR [q1] [45h+37.5h] [7 Credits]
LINFO1112	Algebra	Christophe Craeye Enrico Vitale	FR [q2] [30h+30h] [5 Credits]

Module 2

LINGE1114	Introduction to mathematical modelling : analysis	Heiner Olbermann	FR [q1] [30h+30h] [5 Credits]
LINGE1121	Introduction to mathematical modelling : algebra	Tom Claeys	FR [q2] [30h+30h] [5 Credits]

Probability and statistics

Students follow one of the following blocks:

Module 1

LBIR1315	Probability and statistics II	Patrick Bogaert	FR [q1] [22.5h+22.5h] [3 Credits]
LBIR1212	Probabilities and statistics (I)	Patrick Bogaert	FR [q1] [30h+15h] [4 Credits]

Module 2

LEPL1108	Discrete mathematics and probability	Jean-Charles Delvenne Olivier Pereira	FR [q1] [30h+30h] [5 Credits]
LEPL1109	Statistics and data sciences	Donatien Hainaut Laurent Jacques	FR [q1] [30h+30h] [5 Credits]

Programming and computer science

Students follow one of the following blocks:

LINFO1101	Introduction to programming	Kim Mens Charles Pecheur Cristel Pelsser	FR [q1] [30h+30h] [5 Credits]
LINFO1104	Programming language concepts	Quentin Stiévenart	FR [q2] [30h+30h] [5 Credits]
LEPL1402	Informatics 2	Sébastien Jodogne Ramin Sadre Pierre Schaus	FR [q1] [30h+30h] [5 Credits]

Un cours parmi :

⊠ LINMA2111	Discrete mathematics II : Algorithms and complexity	Jean-Charles Delvenne	EN [q1] [30h+22.5h] [5 Credits] *> French-friendly*
⊠ LINFO1121	Algorithms and data structures	Pierre Schaus	FR [q1] [30h+30h] [5 Credits]

⊠ Computer systems

Students follow one of the following blocks:

○ LINFO1341	Computer networks	Olivier Bonaventure (coord.) Cristel Pelsser	FR [q2] [30h+30h] [5 Credits]
○ LINFO1252	Operating Systems	Etienne Riviere	FR [q1] [30h+30h] [5 Credits]

⊠ Numerical methods and optimisation

Students follow one of the following blocks:

○ LINMA1702	Optimization models and methods I	François Glineur	FR [q2] [30h+22.5h] [5 Credits]

○ Un cours parmi :

⊠ LEPL1104	Numerical methods	Vincent Legat	FR [q2] [30h+30h] [5 Credits]
⊠ LINFO1113	Numerical algorithmic	Sébastien Jodogne Estelle Massart	FR [q2] [30h+30h] [6 Credits]

⊠ Other EU to be determined with the Study Advisor

Depending on his / her previous academic background, the student (in consultation with the study advisor) can add other UEs in order to acquire the necessary prerequisites for the program.

Course prerequisites

There are no prerequisites between course units (CUs) for this programme, i.e. the programme activity (course unit, CU) whose learning outcomes are to be certified and the corresponding credits awarded by the jury before registration in another CU.

The programme's courses and learning outcomes

For each UCLouvain training programme, a reference framework of learning outcomes specifies the the skills expected of every graduate on completion of the programme. Course unit descriptions specify targeted learning outcomes, as well as the unit's contribution to reference framework of learning outcomes.

DATI2M - Information

Access Requirements

Master course admission requirements are defined by the French Community of Belgium Decree of 7 November 2013 defining the higher education landscape and the academic organisation of courses.

General and specific admission requirements for this programme must be satisfied at the time of enrolling at the university.

Unless explicitly mentioned, the bachelor's, master's and licentiate degrees listed in this table or on this page are to be understood as those issued by an institution of the French, Flemish or German-speaking Community, or by the Royal Military Academy.

In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail.

SUMMARY

- > General access requirements
- > Specific access requirements
- > University Bachelors
- > Non university Bachelors
- > Holders of a 2nd cycle University degree
- > Holders of a non-University 2nd cycle degree
- > Access based on validation of professional experience
- > Access based on application
- > Admission and Enrolment Procedures for general registration

Specific access requirements

This programme is taught in English with no prerequisite in French. A certificate is required for the holders of a non-Belgian degree, see selection criteria of the Access on the file.

University Bachelors

Diploma	Special Requirements	Access	Remarks
UCLouvain Bachelors			
Bachelor in Computer Science (Louvain-la-Neuve)		Direct access	
Bachelor in Computer Science (Charleroi)		Direct access	
Bachelor in Engineering		Direct access	
Other Bachelor	Have acquired skills equivalent to those of the minor in computer science or the minor in applied mathematics .	Access based on application	Maximum 60 additional credits integrated into their Masters's degree programme.
Others Bachelors of the French speaking Community of Belgium			
Bachelor in Computer Sciences		Direct access	
Bachelor in Engineering Sciences		Direct access	
Other Bachelor	Have acquired skills equivalent to those of the minor in computer science or the minor in applied mathematics .	Access based on application	See "Personalized access"
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in Computer Sciences		Direct access	
Bachelor in Engineering Sciences		Direct access	
Other Bachelors	Have acquired skills equivalent to those of the minor in computer science or the minor in applied mathematics .	Access based on application	See "Personalized access"
Foreign Bachelors			

Bachelor in Computer Sciences	Access based on application	See "Personalized access"

Non university Bachelors

> Find out more about links to the university

Diploma	Access	Remarks
BA en informatique de gestion - crédits supplémentaires entre 30 et 60 BA en informatique et systèmes, orientation informatique industrielle - crédits supplémentaires entre 30 et 60 BA en informatique et systèmes, orientation réseaux et télécommunications - crédits supplémentaires entre 30 et 60 BA en informatique et systèmes, orientation sécurité des systèmes - crédits supplémentaires entre 30 et 60 BA en informatique et systèmes, orientation technologie de l'informatique - crédits supplémentaires entre 30 et 60 BA en informatique, orientation développement d'applications - crédits supplémentaires entre 30 et 60 BA en informatique, orientation informatique industrielle - crédits supplémentaires entre 30 et 60 BA en informatique, orientation réseaux et télécommunications - crédits supplémentaires entre 30 et 60 BA en informatique, orientation sécurité des systèmes - crédits supplémentaires entre 30 et 60 BA en informatique, orientation technologies de l'informatique - crédits supplémentaires entre 30 et 60	Les enseignements supplémentaires éventuels peuvent être consultés dans le module complémentaire .	Type court

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
Masters			
		Direct access	
Master [120] ingénieur civil en science des données, orientation technologies de l'information - deuxième finalité		Direct access	Au terme du master 120, chaque finalité du Master [120] ingénieur civil en science des données, orientation technologies de l'information 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 Validation of priori experience .

Access based on application

Access based on application : access may be granted either directly or on the condition of completing additional courses of a maximum of 60 ECTS credits, or refused.

Admission on the basis of a submitted dossier may be granted either directly or on the condition of completing additional coursework of a maximum of 60 ECTS credits, or refused.

The first step of the admission procedure requires to submit an application online : https://uclouvain.be/en/study/inscriptions/futurs-etudiants.html

Selection criteria are summarized here (contact : epl-admission@uclouvain.be).

In cases where direct access to the master program is not available or not as described above, an application for admission based on application file may still be submitted to the Enrolment Office.

For any question, please contact epl-admission@uclouvain.be

04/08/2026 : Pending the publication of the 2027-2028 study programme (expected in early March), the selection criteria for 2027-2028 are now available

Admission and Enrolment Procedures for general registration

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. Sometimes, you will be encouraged to discover concepts or techniques on your own, with the teaching staff acting more as a resource to support your learning.

In other instances, teaching will be more transmissive, giving you the keys you need to complete the tasks ahead. An emphasis is placed on non-technical skills (autonomy, organisational skills, time management, communication in various forms, etc.). Thanks in particular to a teaching approach that emphasises project activities (including a large-scale project that puts groups of students in semi-professional situations), the course trains you to develop a critical mind capable of designing, modelling, implementing and validating complex IT systems.

Languages

The lingua franca of data science is mainly English. English is used throughout the programme to help you master the language, which will facilitate your integration into the world of work. Course support materials and supervision are in English. You may, nevertheless, ask questions or take the exam in French if you wish. The programme also offers you the opportunity to take language courses and participate in exchange programmes abroad.

Interdisciplinarity

Data scientists, like many academics over the course of their careers, will find themselves managing projects and teams, and engaging with the complex socio-economic context in which data science operates. You will therefore be encouraged to broaden your training to include other disciplines through elective courses or certain options such as the interfaculty option “creation of small and medium-sized enterprises".

Evaluation

The evaluation methods comply with the Academic regulations and procedures . 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 involves the writing of a document which is defended orally before a jury.

To compute the final grade, the marks obtained for the teaching units are weighted by their respective credits.

Mobility and/or Internationalisation outlook

The EPL has developed over a hundred partnerships in 36 countries (both within and outside EU) to offer exchange programmes to its students. EPL also provides opportunities to obtain double degrees, joint degrees or dual master's degrees in several fields. Currently, EPL participates in two Erasmus Mundus programmes: FAME and STRAINS . .

In addition to exchange programmes under the Erasmus+ programme, numerous agreements have been established with a broad range of universities through various partner networks such as:

- TIME (Top Industrial Managers en Europe).
- CLUSTER
- Magalhães
- Circle U

There are therefore ample opportunities to gain an additional qualification and/or spend part of the year abroad during your two-year master's degree! It's the perfect opportunity to discover or improve your knowledge of a foreign language, tackle subjects from a new angle and gain unique experience in Europe or the rest of the world.

For more information (destinations, testimonials, application procedures), please visit the webpages of the Cellule internationale de l'EPL .

Possible trainings at the end of the programme

The master's degree in data science, information technology orientation can be followed, under certain conditions, by a PhD thesis.

Contacts

Curriculum Management

Entity

Structure entity	SST/EPL/DACS
Denomination	(DACS)
Faculty	Louvain School of Engineering (EPL)
Sector	Sciences and Technology (SST)
Acronym	DACS
Postal address	Avenue Georges Lemaître 4-6 - bte L4.05.01 1348 Louvain-la-Neuve
Website	www.uclouvain.be/epl

Academic supervisor: laurent.jacques@uclouvain.be

Jury

- Président: claude.oestges@uclouvain.be
- Secrétaire du Jury: laurent.jacques@uclouvain.be

Useful Contact(s)

- Secrétariat: pascale.premereur@uclouvain.be