UCLouvain

DATI2M

2025 - 2026

Master [120] in Data Science: Information Technology

⚠ *The version you're consulting is not definitive. This programme still may change. The final version will be published on 1th June.*

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

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DATI2M - **Introduction**

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Introduction

Introduction

The digital transformation of society has led to explosive growth in the volume of data available. Most of the players in society now place great importance on using this data to help make objective decisions and develop their disciplinary focus. These specific needs have resulted in the emergence of **new data-oriented careers.**

The master's in data science: Information Technology a course in **scientific methods and technology tools** for answering social or scientific questions based on **the processing of frequently massive data sets** ("big data"). This discipline usually requires a structured model of the problem in question to be combined with statistics and mathematics to deliver a rigorous, quantitative, operational solution to the question posed. Computer infrastructure and complex calculation algorithms thus complement scientific methods in structuring and processing the data.

A computer infrastructure and complex calculation algorithms also complement these scientific methods to enable the structuring and processing of data.

Finally, cybersecurity has become an essential element in a data-centric world: it will be a question of understanding and being able to manage the risks associated with the data itself, but also of being able to protect stored data and circulate it securely.

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

Your profile

You have completed a bachelor's or master's degree in which you have acquired solid skills and a taste for the three basic building blocks of data science: mathematics, statistics and computer science, as well as a curiosity for the application areas of these disciplines.

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, such as autonomy, critical thinking, rigour, self-learning and the ability to research 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 prepares you for the posts of « data scientist », « data analyst», « security analyst », « data and analytics manager », « data engineer », « security engineer », or « security architect ».

Your programme

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

This common core is completed by the choice of a focus on data analysis or a focus on cybersecurity.

The data analysis 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 five pillars: cryptography, privacy, and hardware, software and system security, as well as an introduction to information theory.

These pillars are completed by majors and elective courses that allow students to deepen their knowledge of algorithmic, computer science, statistical, application or entrepreneurial aspects.

Your parcours

You will primarily develop strong, 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.

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DATI2M - Teaching profile

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Learning outcomes

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

Les étudiants acquerront des connaissances et développeront des compétences nécessaires pour :

- devenir des spécialistes en analyse de données – finalité Analyse de données (AD) (éventail d'algorithmes et de méthodes statistiques, pour la fouille de données, l'apprentissage et la visualisation de grands ensembles de données électronique, production mécanique, automatique et robotique) ou des spécialistes en cybersécurité – finalité Cybersécurité (CS) (cryptographie, sécurité hardware, software et des systèmes informatiques, "privacy", introduction à la théorie de l'information)
- communiquer efficacement
- analyser un problème complexe
- collaborer à un projet de recherche.

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

1. Démontrer la maîtrise d'un solide corpus de connaissances en sciences des données (finalité AD) ou sécurité des données (finalité CS), lui permettant de résoudre les problèmes qui relèvent de sa discipline

1.1. Les structures de données et algorithmes pour l'analyse de données
1.2. Les théories de l'apprentissage, la fouille de données et la visualisation de données de grande dimension
1.3. L'inférence statistique, la modélisation et l'informatique statistique. L'étudiant dans l'orientation technologies de l'information se spécialise via des cours obligatoires ou au choix
1.4. Les aspects industriels et entrepreneuriaux de la science des données. L'étudiant dans l'orientation en technologies de l'information se spécialise via une option
1.5 La sécurité des données dans ses aspects logiciels, matériel ou cryptographiques.
1.6 Les systèmes informatiques, y compris le calcul distribué, le calcul embarqué, les réseaux et la sécurité (cours optionnels).
1.7 Les méthodes numériques et l'optimisation, y compris la programmation par contraintes, la recherche opérationnelle, l'identification et les mathématiques appliquées (cours optionnels)

2. Organiser et de mener à son terme une démarche de développement d'un système d'exploitation et sécurité de données répondant aux besoins généralement complexes d'un client.

2.1. Analyser le problème à résoudre ou les besoins fonctionnels à rencontrer et formuler le cahier des charges correspondant.
2.2. Formaliser et modéliser le problème et concevoir une ou plusieurs solutions techniques originales répondant à ce cahier des charges.
2.3. Evaluer, justifier et classer les solutions au regard de l'ensemble des critères figurant dans le cahier de charges : efficacité, faisabilité, qualité, pertinence et sécurité.
2.4. Implémenter, tester et valider la solution retenue et en interpréter les résultats.
2.5. Formuler des recommandations pour améliorer le caractère opérationnel de la solution.

3. Organiser et de mener à son terme un travail de recherche pour appréhender une problématique inédite liée à l'exploitation et la sécurité des données selon une méthodologie ou dans un environnement nouveau.

3.1. Se documenter et résumer l'état des connaissances actuelles dans le domaine considéré.
3.2. Proposer une modélisation et/ou un dispositif expérimental permettant de simuler et de tester des hypothèses relatives au problème étudié.
3.3. Mettre en forme un rapport de synthèse visant à décrire la méthodologie avec rigueur et expliciter les potentialités d'innovation théoriques et/ou techniques résultant de ce travail de recherche.

4. Contribuer en équipe à la conduite d'un projet d'exploitation et sécurité de données et le mener à son terme en tenant compte des objectifs, des ressources allouées et des contraintes qui le caractérisent.

4.1. Cadrer et expliciter les objectifs d'un projet (en y associant des indicateurs de performance) compte tenu des enjeux et des contraintes qui caractérisent l'environnement du projet.
4.2. S'engager collectivement sur un plan de travail, un échéancier et des rôles à tenir.
4.3. Fonctionner dans un environnement pluridisciplinaire, conjointement avec d'autres acteurs porteurs de différents points de vue : gérer des points de désaccord ou des conflits.
4.4. Prendre des décisions en équipe lorsqu'il y a des choix à faire : que ce soit sur les solutions techniques ou sur l'organisation du travail pour faire aboutir le projet.

5. Communiquer efficacement oralement et par écrit en vue de mener à bien les projets qui lui sont confiés dans son environnement de travail (en particulier en anglais).

5.1. Identifier clairement les besoins du « client » ou de l'usager : questionner, écouter et comprendre toutes les dimensions de sa demande et pas seulement les aspects techniques.
5.2. Argumenter et convaincre en s'adaptant au langage de ses interlocuteurs : techniciens, collègues, clients, supérieurs hiérarchiques.
5.3. Communiquer sous forme graphique et schématique ; interpréter un schéma, présenter les résultats d'un travail, structurer des informations.
5.4. Lire, analyser et exploiter des documents techniques (diagrammes, manuels, cahiers de charge…).
5.5. Rédiger des documents écrits en tenant compte des exigences contextuelles et des conventions sociales en la matière.
5.6. Faire un exposé oral convaincant en utilisant les techniques modernes de communication.

6. Faire preuve à la fois de rigueur, d'ouverture, d'esprit critique et d'éthique dans son travail.

6.1. Appliquer les normes en vigueur dans les disciplines de la science des données (terminologie, mesures de qualité, …).

6.2. Trouver des solutions qui vont au-delà des enjeux strictement techniques, en intégrant les enjeux de dimension éthique d'un projet (y compris la confidentialité des données et la protection de la vie privée) et de développement durable

6.3. Faire preuve d'esprit critique vis-à-vis d'une solution technique pour en vérifier la robustesse et minimiser les risques qu'elle présente au regard du contexte de sa mise en Œuvre.

6.4. S'autoévaluer et développer de manière autonome les connaissances nécessaires pour rester compétent dans son domaine.

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.

For a programme-type, and regardless of the focus, options/or elective courses selected, this master will carry a minimum of 120 credits divided over two annual units, corresponding to 60 credits each.

DATI2M Programme

Detailed programme by subject

CORE COURSES [46.0]

O Mandatory
⊗ Optional
△ Not offered in 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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
O 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

					Year	
					1	2
O LINFO2172	Databases		EN [q2] [30h+30h] [6 Credits] ⊕ > *French-friendly*		x	x
O LSTAT2120	Linear models	Christian Hafner	EN [q1] [30h+7.5h] [5 Credits] ⊕ > *French-friendly*		x	x
O LINFO2262	Machine Learning :classification and evaluation		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		EN [q1] [30h] [3 Credits] ⊕ > *French-friendly*		x	x
⌗ LINMA2120	Applied mathematics seminar	Pierre-Antoine Absil Gianluca Bianchin Frédéric Crevecoeur Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers Estelle Massart (coord.) Geovani Nunes Grapiglia	EN [q1+q2] [30h] [3 Credits] ⊕ > *French-friendly*		x	x
⌗ LSTAT2390	Applied statistics workshops		EN [q1+q2] [15h] [3 Credits] ⊕ > *French-friendly*		x	x

LIST OF FOCUSES

> Professional Focus : Data Analytics *[en-prog-2025-dati2m-ldati210s]*
> Professional Focus : Cybersecurity *[en-prog-2025-dati2m-ldati220s]*

PROFESSIONAL FOCUS : DATA ANALYTICS [30.0]

⭘ Mandatory
⌧ Optional
△ Not offered in 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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
⭘ LDATA2010	Information visualisation	John Lee	EN [q1] [30h+30h] [5 Credits] 🌐 *> French-friendly*		x	x
⭘ LINMA2472	Algorithms in data science	Vincent Blondel Jean-Charles Delvenne (coord.)	EN [q1] [30h+22.5h] [5 Credits] 🌐 *> French-friendly*		x	x
⭘ LINFO2364	Mining Patterns in Data		EN [q2] [30h+15h] [5 Credits] 🌐 *> French-friendly*		x	x
⭘ LSTAT2130	Introduction to Bayesian statistics		EN [q2] [22.5h+7.5h] [5 Credits] 🌐		x	x
⭘ LINFO2275	Data mining & decision making		EN [q2] [30h+15h] [5 Credits] 🌐 *> French-friendly*		x	x
⭘ LELEC2870	Machine learning : regression, deep networks and dimensionality reduction	John Lee Michel Verleysen	EN [q1] [30h+30h] [5 Credits] 🌐 *> French-friendly*		x	x

PROFESSIONAL FOCUS : CYBERSECURITY [30.0]

⭘ Mandatory
⌧ Optional
△ Not offered in 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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
⭘ LELEC2760	Secure electronic circuits and systems	François-Xavier Standaert	EN [q2] [30h+30h] [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
⭘ LINFO2347	Computer system security	Ramin Sadre	EN [q2] [30h+15h] [5 Credits] 🌐 *> French-friendly*		x	x

					Year	
					1	2
O LINFO2144	Secured systems engineering			[q2] [30h+15h] [5 Credits] ⊕ > *French-friendly*	x	x
O LMAT2450	Cryptography			[q1] [30h+15h] [5 Credits] ⊕ > *French-friendly*	x	x
O LELEC2348	Information theory and coding	Jérôme Louveaux Benoît Macq Olivier Pereira		[q2] [30h+15h] [5 Credits] ⊕ > *French-friendly*	x	x

OPTIONS

   L'étudiant·e complète son programme pour arriver à min. 90 crédits disciplinaires (dispensés dans les Masters EPL ou sigle STAT, y compris le TFE) en ce non compris les éventuels compléments pris par certains étudiants qui manqueraient de base. Il n'est pas obligatoire de valider une option.

In the "Options and elective courses in socio-economic knowledge" section, the student validates one of the two options or must choose at least 6 credits from the courses in the option in business issues (maximum one class of innovation 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-2025-dati2m-ldati220o]*
> Major in numerical methods and optimisation *[en-prog-2025-dati2m-ldati221o]*
> Elective technical courses *[en-prog-2025-dati2m-ldati237o]*

Options et cours au choix en connaissances socio-économiques

> Business risks and opportunities *[en-prog-2025-dati2m-ldati231o]*
> Major in Interdisciplinary Program in Entrepreneurship - INEO *[en-prog-2025-dati2m-ldati232o]*

Others elective courses

> Others elective courses *[en-prog-2025-dati2m-ldati223o]*

MAJORS IN DATA SCIENCE: INFORMATION TECHNOLOGY

MAJOR IN COMPUTER SYSTEMS

O Mandatory
⊗ Optional
△ Not offered in 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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

o *Content:*

o **Compulsory courses :**

					Year	
O LINFO2145	Cloud Computing			[q1] [30h+15h] [5 Credits] ⊕ > *French-friendly*	x	x
O LINFO2241	Architecture and performance of computer systems	Tom Barbette		[q1] [30h+30h] [6 Credits] ⊕ > *French-friendly*	x	x

Year
1 2

○ Elective courses

					1	2
⌗ 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		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		EN [q2] [30h+15h] [5 Credits] ⊕ > *French-friendly*		x	x

MAJOR IN NUMERICAL METHODS AND OPTIMISATION

- ⦾ Mandatory
- ⊗ Optional
- △ Not offered in 2025-2026
- ⊘ Not offered in 2025-2026 but offered the following year
- ⊕ Offered in 2025-2026 but not the following year
- △ ⊕ Not offered in 2025-2026 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...)

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

				Year	
				1	2

⦾ *Content:*

⦾ 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	Matrix computations	Raphaël Jungers	EN [q1] [30h+22.5h] [5 Credits] ⊕ > *French-friendly*	x	x

⦾ One course between

⊗ LINFO2266	Advanced Algorithms for Optimization		EN [q1] [30h+15h] [5 Credits] ⊕ > *French-friendly*	x	x
⊗ LINMA2450	Combinatorial optimization	Geovani Nunes Grapiglia	EN [q1] [30h+22.5h] [5 Credits] ⊕ > *French-friendly*	x	x

⊗ Elective courses

⊗ LINMA2470	Stochastic modelling		EN [q2] [30h+22.5h] [5 Credits] ⊕ > *French-friendly*	x	x
⊗ LINMA2491	Operational Research		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		EN [q2] [30h+22.5h] [5 Credits] ⊕ > *French-friendly*	x	x
⊗ LINMA2120	Applied mathematics seminar	Pierre-Antoine Absil Gianluca Bianchin Frédéric Crevecoeur Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers Estelle Massart (coord.) Geovani Nunes Grapiglia	EN [q1+q2] [30h] [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 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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:*

⌗ Statistics

					1	2
⌗ LSTAT2200	Survey and Sampling			[FR] [q2] [15h+5h] [4 Credits] 🌐	x	x
⌗ LSTAT2380	Statistical consulting			[EN] [q1+q2] [30h] [5 Credits] 🌐 > *French-friendly*	x	x
⌗ LSTAT2390	Applied statistics workshops			[EN] [q1+q2] [15h] [3 Credits] 🌐 > *French-friendly*	x	x
⌗ LSTAT2150	Nonparametric statistics: smoothings methods			[EN] [q1] [15h+5h] [4 Credits] 🌐	x	x
⌗ LDATS2450	Statistical learning. Estimation, selection and inference [C]			[EN] [q2] [30h+7.5h] [5 Credits] 🌐	x	x

⌗ Machine learning, vision and artificial intelligence

					1	2
⌗ LELEC2885	Image processing and computer vision			[EN] [q1] [30h+30h] [5 Credits] 🌐 > *French-friendly*	x	x
⌗ LGBIO2010	Bioinformatics	Pierre Dupont		[EN] [q1] [30h+30h] [5 Credits] 🌐 > *French-friendly*	x	x
⌗ LINFO2263	Computational Linguistics	Pierre Dupont		[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
⌗ LINFO2369	Artificial intelligence and machine learning seminar			[EN] [q1] [30h] [3 Credits] 🌐 > *French-friendly*	x	x
⌗ LINFO2381	Health Informatics			[EN] [q2] [30h+30h] [5 Credits] 🌐 > *French-friendly*	x	x

⌗ Data structures and algorithms for data analysis

					1	2
⌗ LINFO2345	Languages and algorithms for distributed Applications	Peter Van Roy		[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	Yves Deville		[FR] [q2] [30h+30h] [5 Credits] 🌐	x	x

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

BUSINESS RISKS AND OPPORTUNITIES

⊘ Mandatory
⊗ Optional
△ Not offered in 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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...)

The student who wishes to validate this option must select at least 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.

				Year	
				1	**2**

⊗ *Content:*

⊗ Cours spécifiques aux enjeux de l'entreprise

				1	2
⊗ LFSA2995	Company Internship	Dimitri Lederer	[FR] [q1+q2] [30h] [10 Credits] ⊕	x	x
⊗ LEPL1805	People management [M] *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 [M]		[EN] [q1+q2] [30h+0h] [3 Credits] ⊛ *> French-friendly*		x
⊗ LEPL2210	Ethics and ICT *This course cannot be chosen if the LLSMS2280 course has already been validated.*	Axel Gosseries Olivier Pereira	[EN] [q2] [30h] [3 Credits] ⊕ *> French-friendly*	x	x
⊗ LEPL2211	Introduction to new venture management [M]	Benoît Gailly	[EN] [q2] [30h] [3 Credits] ⊕ *> French-friendly*	x	x
⊗ LEPL2214A	Law, Regulation and Legal Context - Law, regulation and legal context (partim A)		[FR] [q1] [30h+0h] [3 Credits] ⊕	x	x
⊗ LMECA2645	Major technological hazards in industrial activity.		[FR] [q2] [30h] [3 Credits] ⊕	x	x
⊗ LMECA2711	Quality management and control.		[EN] [q2] [30h+30h] [5 Credits] ⊕ *> French-friendly*	x	x
⊗ LLSMS2036	Supply Chain Procurement	Per Joakim Agrell	[EN] [q1] [30h] [5 Credits] ⊕	x	x
⊗ LLSMS2280	Business Ethics and Compliance Management *Ce cours ne peut être choisi si le cours LEPL2210 a déjà été validé.*		[EN] [q1] [30h] [5 Credits] ⊕	x	x

⊗ Innovation classe
*Maximum one innovation class can be chosen.*

				1	2
⊗ LEPL2021	Innovation classes for transition and sustainable development		[EN] [q1] [30h+15h] [5 Credits] ⊕	x	x
⊗ LEPL2022	Health Innovation Classes [C]		[EN] [q2] [30h+30h] [5 Credits] ⊕ *> French-friendly*	x	x

⊘ Courses offered by the Program Commission

				1	2
⊗ LSTAT2380	Statistical consulting		[EN] [q1+q2] [30h] [5 Credits] ⊕ *> French-friendly*	x	x
⊗ LSTAT2390	Applied statistics workshops		[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 Gianluca Bianchin Frédéric Crevecoeur Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers Estelle Massart (coord.) Geovani Nunes Grapiglia	EN [q1+q2] [30h] [3 Credits] ⊕ *> French-friendly*	x	x
⌘ LACTU2170	Financial valuation of actuarial liabilities		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	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		EN [q1+q2] [0h] [5 Credits] ⊕ *> French-friendly*	x	x

MAJOR IN INTERDISCIPLINARY PROGRAM IN ENTREPRENEURSHIP - INEO

Commune à la plupart des masters de l'EPL, cette option a pour objectif de familiariser l'étudiant·e avec les spécificités de l'entreprenariat et de la création d'entreprise afin de développer chez lui les aptitudes, connaissances et outils nécessaires à la création d'entreprise.

Cette option rassemble des étudiants de différentes facultés en équipes interdisciplinaires afin de créer un projet entrepreneurial. La formation interdisciplinaire en entrepeneuriat (INEO) est une option qui s'étend sur 2 ans et s'intègre dans plus de 30 Masters de 9 facultés/écoles de l'UCLouvain. Le choix de l'option INEO implique la réalisation d'un mémoire interfacultaire (en équipe) portant sur un projet de création d'entreprise. L'accès à cette option, ainsi qu'à chacun des cours, est limité aux étudiant·es sélectionnés sur dossier. Toutes les informations sur https://uclouvain.be/fr/etudier/ineo.

L'étudiant.e qui choisit de valider cette option doit sélectionner au minimum 20 crédits et au maximum 25 crédits. Cette option n'est pas accessible en anglais et ne peut être prise simultanément avec l'option « Enjeux de l'entreprise ».

O Mandatory
⌗ Optional
△ Not offered in 2025-2026
⊘ Not offered in 2025-2026 but offered the following year
⊕ Offered in 2025-2026 but not the following year
△ ⊕ Not offered in 2025-2026 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

o **Content:**

o **Cours obligatoires:**

					Year 1	Year 2
O LINEO2001	Théorie de l'entrepreneuriat	Frank Janssen	[FR] [q1] [30h+20h] [5 Credits] ⊕		x	
O LINEO2002	Aspects juridiques, économiques et managériaux de la création d'entreprise	Yves De Cordt	[FR] [q1] [30h+15h] [5 Credits] ⊕		x	
O 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
O LINEO2004	Séminaire d'approfondissement en entrepreneuriat	Frank Janssen	[FR] [q2] [30h+15h] [5 Credits] ⊕		x	

⌗ **Cours préalable:**

					Year 1	Year 2
O LINEO2021	Financer son projet		[FR] [q2] [30h+15h] [5 Credits] ⊛		x	

OTHERS ELECTIVE COURSES

Les cours au choix recommandés et accessibles aux étudiant·es du master ingénieur en sciences des données ou du master en sciences des données sont listés ci-dessus, dans les options et autres listes de cours au choix. L'étudiant·e est également libre de proposer d'autres cours des programmes de Masters EPL qui seraient pertinentes à son parcours personnel, pour autant que cela respecte les règles de constitution de programme du Master. Ces cours doivent être approuvés par le jury restreint.

OTHERS ELECTIVE COURSES

- ○ Mandatory
- ⌗ Optional
- △ Not offered in 2025-2026
- ⊘ Not offered in 2025-2026 but offered the following year
- ⊕ Offered in 2025-2026 but not the following year
- △ ⊕ Not offered in 2025-2026 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 Master students in Data Science Engineering are listed here above and in the courses of EPL. However, a student can further suggest other courses that would be relevant for his.her personal curriculum, pending that this is compliant with the rules for setting up a personal Master programme.

⌗ **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	Caroline Klein (coord.)	DE [q1+q2] [30h] [3 Credits] ⊕	x	x
⌗ LALLE2501	Professional development seminar-German	Caroline Klein (coord.)	DE [q1+q2] [30h] [5 Credits] ⊕	x	x
⌗ LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1) [M]	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		FR [q1] [15h+30h] [3 Credits] ⊕	x	x
⌗ LEPL2352	Become a tutor		FR [q2] [15h+30h] [3 Credits] ⊕	x	x

⌗ **Autres UEs hors-EPL**

L'étudiant·e peut choisir maximum 8 crédits de cours hors EPL, considérés comme non-disciplinaires par la commission de programme.

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:

- O Mandatory
- ✗ Optional
- △ Not offered in 2025-2026
- ⊘ Not offered in 2025-2026 but offered the following year
- ⊕ Offered in 2025-2026 but not the following year
- △ ⊕ Not offered in 2025-2026 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
The student follows one of the following blocks:

✗ Module 1

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

✗ Module 2

O LINGE1114	Introduction to mathematical modelling : analysis [M]		[FR] [q1] [30h+30h] [5 Credits] ⊕
O LINGE1121	Introduction to mathematical modelling : algebra [M]		[FR] [q1] [30h+30h] [5 Credits] ⊕

O Probability and statistics
The student follows one of the following blocks:

✗ Module 1

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

✗ Module 2

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

O Programming and computer science
The student follows one of the following blocks:

O LINFO1101	Introduction to programming	Kim Mens Siegfried Nijssen Charles Pecheur	[FR] [q1] [30h+30h] [5 Credits] ⊕
O LINFO1104	Programming language concepts	Peter Van Roy	[FR] [q2] [30h+30h] [5 Credits] ⊕
O LEPL1402	Informatics 2		[FR] [q1] [30h+30h] [5 Credits] ⊕

O Un cours parmi :

✗ LINMA2111	Discrete mathematics II : Algorithms and complexity	Vincent Blondel Jean-Charles Delvenne	[EN] [q1] [30h+22.5h] [5 Credits] ⊕ *> French-friendly*

⚕ LINFO1121	Algorithms and data structures		FR [q1] [30h+30h] [5 Credits] ⊕

⚕ Computer systems:

The student follows one of the following blocks:

O LINFO1341	Computer networks		FR [q2] [30h+30h] [5 Credits] ⊕
O LINFO1252	Informatic Systems		FR [q1] [30h+30h] [5 Credits] ⊕

⚕ Numerical methods and optimisation:

The student follows one of the following blocks:

O LINMA1702	Optimization models and methods I		FR [q2] [30h+22.5h] [5 Credits] ⊕

O Un cours parmi :

⚕ LEPL1104	Numerical methods	Vincent Legat	FR [q2] [30h+30h] [5 Credits] ⊕
⚕ LINFO1113	Numerical algorithmic		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).

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. 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.

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

Mobility and/or Internationalisation outlook

Over the years, EPL has developed over a hundred partnerships with partners in more than 36 countries (EU and non-EU) to offer exchange programmes to its students. We also offer the possibility of obtaining Double degrees, Joint Degrees or Dual Masters in several fields. The EPL is currently participating in two Erasmus Mundus programmes: FAME and STRAINS.

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

- TIME network (Top Industrial Managers in Europe).

- CLUSTER network

- Magalhães network

- Circle U. network through several networks and European University Alliance

So, there's no shortage of 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.

If you would like more information, please visit the dedicated pages of the EPL International Office to discover all the destinations, testimonials from former students and all the procedures to follow to make these opportunities a success.

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 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

Jury

- Président: Claude Oestges
- Secrétaire du Jury: Siegfried Nijssen

Useful Contact(s)

- Secrétariat: Pascale Premereur