




OPTIONS EN SCIENCES INFORMATIQUES

MAJOR IN ARTIFICIAL INTELLIGENCE: BIG DATA, OPTIMIZATION AND ALGORITHMS

| | | | | Year | |
|-------------|-------------------------------|--|--|------|---|
| | | | | 1 | 2 |
| ⌘ LINMA2472 | Algorithms in data science | Jean-Charles Delvenne (coord.) Gautier Krings (compensates Vincent Blondel) | EN [q1] [30h+22.5h] [5 Credits]  > French-friendly | x | x |
| ⌘ LINFO2275 | Data mining & decision making | Marco Saerens | EN [q2] [30h+15h] [5 Credits]  > French-friendly | x | x |
| ⌘ LINFO2381 | Health Informatics | Sébastien Jodogne | EN [q2] [30h+30h] [5 Credits]  > French-friendly | x | x |

MAJOR IN SOFTWARE ENGINEERING AND PROGRAMMING SYSTEMS**Students completing the major “Software engineering and programming systems” will be able to:**

- Understand and explain problems that come up during large scale software projects as well as the long-term critical impact that their choice of solutions may have (construction dimensions as well as validation, documentation, communication and management of a project involving large teams as well as costs and deadlines),
- Select and apply methods and tools of software engineering to develop complex software systems and meet strict quality standards: reliability, adaptability, scalability, performance, security, usefulness,
- Model the products and processes necessary to obtain such systems and analyse these models,
- Develop and implement analytical programmes focused on conversion and optimisation as well as computer representations,
- Put to good use different programming paradigms and languages, in particular those that deal with functional, object-oriented and competing programmes,
- Understand the issues associated with different and competing programming models and use the appropriate model,
- Define a new language (syntax and semantics) suitable to a specific context.

○ Mandatory

⌘ Optional

△ Not offered in 2023-2024

⊙ Not offered in 2023-2024 but offered the following year

⊕ Offered in 2023-2024 but not the following year

△ ⊕ Not offered in 2023-2024 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...)

From 20 to 30 credit(s)

Year

1 2

o Content:**o Required courses in software engineering and programming systems**

○ LINFO2143

Concurrent systems : models and analysis

Charles Pecheur

EN

OPTION NETWORKS AND SYSTEMS

Students who have completed the "Networks and Systems" track should be able to:

- Understand and explain different devices and protocols used in computer and cellular networks;
- Design, configure and manage computer networks while taking into account application needs;
- Understand the operation of IoT and cellular networks;
- Explain the problems that affect cellular and IoT networks and develop solutions to cope with them;
- Understand how to optimise applications to efficiently use parallel cores;
- Understand, implement and use lock-free data structures;
- Understand the interactions between real-time operating systems and hardware;
- Design and implement applications running on embedded systems

○ Mandatory

⊗ Optional

△ Not offered in 2023-2024

⊙ Not offered in 2023-2024 but offered the following year

⊕ Offered in 2023-2024 but not the following year

△ ⊕ Not offered in 2023-2024 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 shall select 20 to 30 credits among:

Year

1 2

o Content:

o Required courses in Networks and systems

| | | | |
|-------------|---|---------------------|----|
| ○ LINFO2142 | Computer networks: configuration and management | Olivier Bonaventure | EN |
|-------------|---|---------------------|----|

OPTION EN INFORMATIQUE MÉDICALE

Students completing the major in "Health informatics" will be able to:

- Identify and use methods and techniques that provide software-based solutions to complex problems encountered in hospitals, in bio-pharmaceutical environments, in life sciences, or in digital health.
- Take part in multidisciplinary projects bringing together medical, biological and engineering expertise to the benefit of patient health.
- Understand and put to good use the methods and techniques pertaining to medical informatics and bioinformatics, such as artificial intelligence, health interoperability, clinical knowledge structuring, applied statistics, information security, software quality, as well as the effective management and processing of large volumes of data.
- Understand specific categories of applications where these methods and techniques can be applied, such as diagnostic support, therapeutic assistance, hospital information systems, medical and biomedical imaging, smart devices, clinical trials, health data mining, as well as automated processing of the medical language.
- Formalize and structure a body of complex knowledge by using a systematic and rigorous approach to the development of high-quality medical and biomedical information systems.

- Mandatory
- ✂ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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 shall select 20 to 30 credits among:

Year

1 2

o **Content:**

EN 12 [30h+30h] [5 Credits]
 > French-friendly

o **Cours obligatoires en Informatique médicale**

| | | | | | |
|--------------------|---------------------------|---|--|---|---|
| ○ LGBIO2050 | Medical Imaging | Greet Kerckhofs John Lee Benoît Macq Frank Peeters | 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 |
| ○ LINFO2381 | Health Informatics | | | | |

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'entrepreneuriat 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 entrepreneuriat (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> (<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 ».

- Mandatory
- ✘ Optional
- △ Not offered in 2023-2024
- Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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

COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

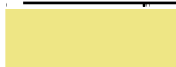
- Mandatory
- ✘ Optional
- △ Not offered in 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
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- 🌐 Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:



| | | | | Year | |
|-------------|---|--|-----------------------------------|------|---|
| | | | | 1 | 2 |
| ⌘ LNEER2500 | Seminar of Entry to professional life in Dutch - Intermediate level | Isabelle Demeulenaere (coord.) | SE [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 | SE [q1 or q2] [30h] [3 Credits] 🌐 | x | x |

⌘ Group dynamics

| | | | | | |
|------------|----------------|--|---------------------------------|---|---|
| ⌘ LEPL2351 | Become a tutor | Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoën Benoît Raucent | SE [q1] [15h+30h] [3 Credits] 🌐 | x | x |
| ⌘ LEPL2352 | Become a tutor | Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoën Benoît Raucent | SE [q2] [15h+30h] [3 Credits] 🌐 | x | x |

Jean-Charles
Delvenne (coord.)
Delphine Ducarme

Supplementary classes

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

- Mandatory
 - ⊗ Optional
 - △ Not offered in 2023-2024
 - ⊙ Not offered in 2023-2024 but offered the following year
 - ⊕ Offered in 2023-2024 but not the following year
 - △ ⊕ Not offered in 2023-2024 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, ...)
-

Course prerequisites

The **table** below lists the activities (course units, or CUs) for which there are one or more prerequisites within the programme, i.e. the programme CU for which the learning outcomes must be certified and the corresponding credits awarded by the jury before registering for that CU.

These activities are also identified **in the detailed programme**: their title is followed by a yellow square.

Prerequisites and student's annual programme

As the prerequisite is for CU registration purposes only, there are no prerequisites within a programme year. Prerequisites are defined between CUs of different years and therefore influence the order in which the student will be able to register for the programme's CUs.

In addition, when the jury validates a student's individual programme at the beginning of the year, it ensures its coherence, meaning that it may:

- require the student to combine registration in two separate CUs which it considers necessary from a pedagogical point of view.
- transform a prerequisite into a corequisite if the student is in the final year of a degree course.

For more information, please consult the

SINF2M - 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. See selection criteria of the Access on the file.

University Bachelors

| Diploma | Special Requirements | Access | Remarks |
|---|--|---------------------------------|---|
| UCLouvain Bachelors | | | |
| Bachelor in Computer Science | | Direct access | |
| Bachelor in Economics and Management Bachelor in Mathematics Bachelor in Engineering : Architecture | Minor in Computer Sciences | Access with additional training | maximum 60 additional credits integrated into their Master's degree programme If the UCLouvain Admissions Office considers the enrolment application sufficiently complete, it will submit the application to the faculty for a decision |
| Others Bachelors of the French speaking Community of Belgium | | | |
| Bachelor in computer science | | Direct access | |
| Bachelors of the Dutch speaking Community of Belgium | | | |
| Bachelor in de informatica | | Direct access | |
| Foreign Bachelors | | | |
| Bachelor in computer science | | Access based on application | See "Personalized Access" |

Non university Bachelors

> Find out more about [links](#) to the university

| Diploma | Access | Remarks |
|---|---|------------|
| BA en informatique, orientation développement d'applications - crédits supplémentaires entre 30 et 60 | Les enseignements supplémentaires éventuels | Type court |

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

peuvent être consultés dans le [module complémentaire](#).

Holders of a 2nd cycle University degree

| Diploma | Special Requirements | Access | Remarks |
|----------------------------|----------------------|--------|---------|
| "Licenciés" | | | |
| "Licencié en informatique" | | - | |
| Masters | | | |
| Master in computer science | | - | |

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

Teaching method

Active learning and non-technical skills

You will play an active role in your training. The pedagogical approach is a well-balanced mix of lectures, exercises, and projects to be carried out alone or in a group. The teaching methods vary. Sometimes, you will discover concepts and techniques independently. At these times, the teaching team acts as a resource in the learning process. At other times, the pedagogy focuses on transmitting the knowledge necessary to complete future tasks.

Special emphasis is placed on non-technical skills (autonomy, organisation, time management, different modes of communication, etc.) In particular, by emphasising project-based activities (including a large scale project that puts students in a semi-professional situation), this programme develops students' critical thinking skills, which allows them to design, model, implement, and validate complex computing systems.

Languages

The lingua franca of computer science is English. The use of English in the programme allows students to develop their mastery of this language, which facilitates their integration into professional life. All course material and course supervision are in English. However, students may always ask or respond to exam questions in French if desired.

Moreover, the programme allows students to attend language courses at the university's Language Institute (ILV) and to take part in exchange programmes.

Interdisciplinary approach

Over the course of their careers, computer scientists are expected to manage projects as well as teams and show interest in the complex socio-economic environment in which computer science belongs. It is therefore suggested that students learn about disciplines through elective courses or certain major courses such as the interfaculty major "small and medium sized business creation".

Evaluation

Students are informed about the different exchange programmes in the second year of their Bachelor's degree programme. They are encouraged to prepare in advance, specifically their language skills through classes offered at the Institute for Living Languages (Institut des langues vivants) at UCLouvain.

Beyond exchange programmes, students may intern in a research laboratory or a foreign company.

Incoming students

Thanks to the CLUSTER network, foreign students have the same status as local UCLouvain students. UCLouvain favours students coming from institutions that participate in the Socrates exchange network.

Overall the Master's degree programme is taught in English and does not require previous knowledge of French with the exception of the majors in biomedical engineering, management and small and medium sized business creation (CPME). Except for rare cases, all

