

SINF2M - Introduction

Introduction

Introduction

This Master's degree programme tries to strike a **balance between “soft skills” and scientific and technical knowledge, between excellence in research and the pragmatism of field work.** It offers:

- an approach to computer science based on fundamental **concepts** that keep up with the rapid pace of technological progress;
- a programme taught **entirely in English** in order to improve students' language skills, especially in technical English (both written and spoken);
- **exchange programmes** and dual degrees in Belgium, Europe and across the world.

Your profile

You would like to

- **Imagine, design, and implement** computer science systems that will shape the future;
- continue your education beyond the Bachelor's degree with a major in computer sciences (or the equivalent);
- improve your **theoretical knowledge**

5. communicate effectively (orally or in writing) with the goal of carrying out assigned projects in the workplace (in English in particular)

- 5.1. Identify the needs of the client or the user: question, listen and understand all aspects of their request and not just the technical aspects.
- 5.2. Present your arguments and adapt to the language of your interlocutors: technicians, colleagues, clients, superiors
- 5.3. Communicate through graphics and diagrams: interpret a diagram, present project results, structure information
- 5.4. Read and analyse different technical documents (rules, plans, specification notes)
- 5.5. Draft documents that take into account contextual requirements and social conventions
- 5.6. Make a convincing oral presentation using modern communication techniques.

6. Demonstrate rigor, openness and critical thinking as well as a sense of ethics in your work

- 6.1. Rigorously apply the standards of your discipline (terminology, measurement units, quality standards and security)
- 6.2. Find solutions that go beyond strictly technical issues by considering sustainable development and the socio-economic ethics of a project
- 6.3. Demonstrate critical awareness of a technical solution in order to verify its robustness and minimize the risks that may occur during implementation.
- 6.4. Evaluate oneself and independently develop necessary skills to remain knowledgeable in the field.

Programme structure

The program consists of four parts:

- a common core (30 credits), including a final thesis (25 credits).
- a specialized focus, compulsory training (30 credits).
- one or more options allowing students to specialize in a field of IT (20-40 credits).
- elective courses (20-40 credits).

The graduation project is normally carried out in the last year. However, students may, depending on their training, conduct other courses in either the first or second year so long as they have completed the prerequisite courses. This is especially the case for students who have completed a portion of their studies abroad. The yearly allocation of course activities found in the detailed programme description is for information purposes only.

In general, this Master's degree will consist of a minimum of 120 credits spread over two years with 60 credits taken per year (regardless of the focus, major or elective courses selected).

SINF2M Programme

Detailed programme by subject

CORE COURSES [30.0]

- Mandatory
- ⊗ Optional
- △ Not offered in 2024-2025
- ⊙ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 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...)

MAJOR IN SOFTWARE ENGINEERING AND PROGRAMMING SYSTEMS

Cloud Computing

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

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■ 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

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

○ LINFO2143	Concurrent systems : models and analysis	Charles Pecheur	30 [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
○ LINFO2251	Software Quality Assurance	Charles Pecheur	30 [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
○ LINFO2252	Software Maintenance and Evolution	Kim Mens	30 [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
○ LINFO2345	Languages and algorithms for distributed Applications	Peter Van Roy	30 [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X

Elective courses in Software Engineering and Programming Systems

The student can select 10 credits among

⊗ LINFO2145	Cloud Computing	Etienne Riviere	30 [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2347					

OPTION IN DATA SCIENCE AND APPLIED MATHEMATICS

Students completing the major “Data science and Applied Mathematics” must be able to:

- Understand engineering fields requiring synergy between applied mathematics and computer science such as algorithms, scientific calculations, modelling computer systems, optimisation, machine learning or data mining;
- Understand and put to good use algorithms and techniques used in data science;

⌘ LMECA2170

OPTION EN CYBERSECURITY

Students who have completed the "Cybersecurity and Information Technology" track should be able to:

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

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△ ⊕ Not offered in 2024-2025 or the following year

■ Activity with requisites

🌐 Open to incoming exchange students

🚫 Not open to incoming exchange students

(FR) Teaching language (FR, 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



Open Source Project

- Mandatory
- ⊗ Optional
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Year

1 2

Content:

⊗ LINFO2401	Open Source strategy for software development	Lionel Dricot	EN [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2402	Open Source Project		EN [q1+q2] [0h] [5 Credits] 🌐 > French-friendly	X	X

OPTIONS ET COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- ⊗ Optional
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Les étudiant-es doivent réussir au moins 15 crédits pour valider l'option. Cette option ne peut être prise simultanément avec l'option « Formation interdisciplinaire en création d'entreprise - CPME ».

Year

1 2




Content:

● LEPL2211

Year

1 2

⌘ Cours en Sourcing and Procurement

⌘ LLSMS2036	Supply Chain Procurement	Per Joakim Agrell Antony Paulraj	EN [q1] [30h] [5 Credits] 	X	X
⌘ LLSMS2038	Procurement Organisation and Scope	Constantin Blome Canan Kocabasoglu Hillmer (compensates Constantin Blome)	EN [q1] [30h] [5 Credits] 	X	X
⌘ LLSMS2037	Sourcing Strategy	Constantin Blome Michael Henke	EN [q1] [30h] [5 Credits] 	X	X

⌘ Alternative to the major in business risks and opportunities for computer science students

Computer science students who have already taken courses in this field while pursuing their Bachelor's degree may choose between 16-20 credits from the courses offered in the management minor for computer sciences.

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.

COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

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- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫🌐 Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o **Content:**

⊗ LFSA2995	Company Internship	Dimitri Lederer Jean-Pierre Raskin	(FR) [q1+q2] [30h] [10 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
⊗ LEPL2021	Innovation classes for transition and sustainable development	Benoît Macq Xavier Marichal (compensates) Benoît Raucent Viktória Nagy (compensates) Benoît Raucent	EN [q1] [30h+15h] [5 Credits] 🌐	X	X

OTHERS ELECTIVE COURSES

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- Activity with requisites
- 🌐 Open to incoming exchange students
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- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o **Content:**

Les étudiant-e-s peuvent également inscrire à leur programme tout cours faisant partie des programmes d'autres masters de l'EPL moyennant l'approbation du jury restreint.

⊗ **Languages**

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

				Year	
				1	2
⊗ LALLE2501	Professional development seminar-German	Caroline Klein (coord.) Mélanie Mottin (compensates) Caroline Klein	DE [q1+q2] [30h] [5 Credits]	x	x
⊗ LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	ES [q1] [30h] [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 Pardoën Benoît Raucent	FR [q1] [15h+30h] [3 Credits]	x	x
⊗ LEPL2352	Become a tutor	Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoën Benoît Raucent	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.

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.

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

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"			
"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

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.

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 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

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".

The learning activities are assessed according to the rules of the University (see exam regulations), that is through written and oral exams, personal or group assignments, public presentation of projects and defence of the graduation thesis. For the courses given in English, questions will be expressed in English by the teacher, but the student may choose to answer in French. For the courses given in French, the questions will be expressed in French by the teacher, but the student may ask for help in translation and choose to answer in English.

Some activities such as projects during the semester under the supervision of the teaching staff and in collaboration with other students are not reorganized outside the period prescribed for the course. They are not re-evaluated at a later session.

Evaluation methods specific to each course are communicated to students by teachers at the beginning of the semester.

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: [oav-1 times,994 0 innders0gbfabrg 1 0 6. It is 341.0920w0 - 1 w 0 0. 0 MNdr\)1 0 535.45501709](#)

The Master's degree in computer science may be followed by a doctoral programme in engineering sciences.

Most of the UCLouvain Master's degree programmes (generally 60) are open to UCLouvain Master's degree diploma holders. For example:

Different Master's degree programmes (60) in management (automatic admission based on written application): see this list

