

At Louvain-la-Neuve - 60 credits - 1 year - Day schedule - In EnglishDissertation/Graduation Project : **YES** - Internship : **NO**Activities in English: **YES** - Activities in other languages : **NO**Activities on other sites : **NO**Main study domain : **Sciences**Organized by: **Louvain School of Engineering (EPL)**Programme acronym: **SINF2M1** - 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	6
The programme's courses and learning outcomes	7
Information	8
Access Requirements	8
Teaching method	10
Evaluation	10
Mobility and/or Internationalisation outlook	10
Possible trainings at the end of the programme	10
Contacts	10

SINF2M1 - Introduction

Introduction

Introduction

The objective of this Master's degree programme is to train computer science professionals capable of understanding and analysing the complex needs of a company, of designing computing systems that meet those needs, of mastering the rapidly evolving technological tools in this area, of implementing solutions, of assuring quality products and procedures in a company.

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 and develop your technical expertise in fields like artificial intelligence, computer networks, information security, software engineering and programming systems;
- improve your interdisciplinary knowledge in areas such as foreign languages, resource management, teamwork, autonomy and ethics.

Your future job

We train

- professionals who will design computer systems that meet users' needs;
- innovators who can master a wide range of constantly evolving technologies;
- specialists capable of implementing software solutions with particular attention paid to product quality and its development process.

Your programme

This Master's degree programme consists of

- a core curriculum aiming to provide the knowledge and skills necessary to model and design complex applications. Topics covered include artificial intelligence, computer networking, software engineering, compilers and data bases;
- general knowledge courses such as classes in management and human resources (as a comprehensive university, UCL offers numerous general knowledge courses according to student interest);
- a graduation project that offers students the possibility to study a subject in-depth and thanks to its size, introduces students to the professional life of a computer scientist or researcher; the topic of this project is selected in consultation with the programme supervisors and possibly a company.

SINF2M1 - Teaching profile

Learning outcomes

The computer science developers and designers of tomorrow face two major challenges:

- increasingly complex computer science systems
- increasingly varied areas of application

In order to meet these challenges, future diploma holders should:

- master real computer science technologies but also keep up with their constant progress
- work as part of multidisciplinary teams that take into account non-technical issues

The future diploma holder in computer science will acquire the knowledge and skills to become:

- scientists who know how to understand and analyse the complex requirements that a computer system must meet;
- professionals who will design computer systems that meet users' needs;
- specialists capable of implementing software solutions with particular attention paid to product quality and its development process;

This Master's degree programme (60) provides an in-depth understanding of concepts and emphasises abstract thinking. This theoretical approach is complemented by the application of these concepts. The programme thus includes numerous projects and studies.

Apart from certain exceptions outlined in the detailed course programme, all courses in the programme are given in English. The mastery of this language is indispensable in the area of computer science.

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

1.démontrer la maîtrise d'un solide corpus de connaissances en informatique, lui permettant de résoudre les problèmes qui relèvent de sa discipline

2.organiser et de mener à son terme une démarche de développement d'un système informatique répondant aux besoins généralement complexes d'un client

3.contribuer en équipe à la conduite d'un projet et de le mener à son terme en tenant compte des objectifs, des ressources allouées et des contraintes qui le caractérisent

4.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).

1.demonstrate mastery of a solid body of knowledge in computer science allowing them to solve problems raised in their field of study

This Master's degree programme aims to provide students with advanced knowledge and is based on the fundamentals of computer science acquired in the Bachelor's degree programme. A diversity of subjects are offered in the common curriculum:

- Networking;
- Programming languages;
- Software engineering;
- Artificial intelligence .

2.organise and carry out the development of a computer system that meets the complex demands of a client

2.1.Analyse a problem to solve or functional needs to be met and formulate a corresponding specifications note.

2.2.Model a problem and design one or more technical solutions in line with the specifications note.

2.3.Evaluate and classify solutions in light of all the criteria included in the specifications note: efficiency, feasibility, quality, ergonomics and environmental security.

2.4. Implement and test the chosen solution.

2.5.Come up with recommendations to improve the operational nature of the solution.

3.contribute as part of a team to the planning and completion of a project while taking into account its objectives, allocated resources, and constraints

3.1. Frame and explain the project's objectives (in terms of performance indicators) while taking into account its issues and constraints

3.2. Collaborate on a work schedule, deadlines and roles

3.3. Work in a multidisciplinary environment with peers holding different points of view; manage any resulting disagreement or conflicts

3.4. Make team decisions and assume the consequences of these decisions (whether they are about technical solutions or the division of labour to complete a project)

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

4.1. Identify the needs of the client or the user: question, listen and understand all aspects of their request and not just the technical aspects

4.2. Present your arguments and adapt to the language of your interlocutors: technicians, colleagues, clients, superiors

4.3. Communicate through graphics and diagrams: interpret a diagram, present project results, structure information

4.4. Read and analyse different technical documents (rules, plans, specification notes)

- 4.5. Draft documents that take into account contextual requirements and social conventions
- 4.6. Make a convincing oral presentation using modern communication techniques
5. demonstrate rigor, openness and critical thinking as well as a sense of ethics in your work
- 5.1. Rigorously apply the standards of your discipline (terminology, measurement units, quality standards and security)
- 5.2. Find solutions that go beyond strictly technical issues by considering sustainable development and the socio-economic ethics of a project
- 5.3. Demonstrate critical awareness of a technical solution in order to verify its robustness and minimize the risks that may occur during implementation
- 5.4. Evaluate oneself and independently develop necessary skills to remain knowledgeable in the field

Programme structure

The Master's degree programme (60) in computer science consists of a minimum of 60 credits spread over one year (under certain conditions). It consists of a core curriculum (50 credits) and 2 elective course (10 credits).

This programme may vary depending on students' prior course of study. If during their previous studies, students have already taken a required class or completed an equivalent activity, they may substitute this course with an activity of their choice from the Master's degree programme (120) in computer science (provided they follow the programme guidelines). They will also verify that the minimum number of required credits for their diploma has been obtained.

Such programmes will be submitted to the appropriate programme commission for approval.

The majority of courses in this programme are offered in English. For non-Francophone students, alternative courses will be suggested by the programme commission as substitutes for required courses taught in French. This will be done on a case by case basis depending on the student's curriculum.

It is always possible for students to speak in French in class or during evaluations. Specifically, the graduation thesis/project may be written and defended in either English or French.

SINF2M1 Programme

Detailed programme by subject

CORE COURSES

- Mandatory
- ✘ Optional
- △ Not offered in 2021-2022
- Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- 🌐 Open to international students
- 🚫 Not open to international students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

o Specialised courses in computer science

● LINFO2132	Languages and translators	Nicolas Laurent	EN [q2] [30h+30h] [6 Credits]
● LINFO2241	Architecture and performance of computer systems	Ramin Sadre	EN [q1] [30h+30h] [6 Credits]
● LINFO2255	Software engineering project	Axel Legay	EN [q1] [30h+30h] [6 Credits]
● LINFO2262	Machine Learning :classification and evaluation	Pierre Dupont	EN [q2] [30h+30h] [6 Credits]
● LINFO2172	Databases	Siegfried Nijssen	EN [q2] [30h+30h] [6 Credits]

o Elective courses

En plus des 2 UE ci-dessous, l'étudiant-e doit prendre un cours au choix de 5 crédits dans le porte-feuille de l'UCL avec accord de la commission de programme.

o LINFO2401	Open Source strategy for software development	Lionel Dricot	ES [q1] [30h+15h] [5 Credits]
o LINFO2402	Open Source Project		ES [q1+q2] [0h] [5 Credits]

o Master Thesis (15 credits)

o LINFO2991	Graduation project/End of studies project		ES [q1+q2] [] [15 Credits]
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Supplementary classes

To access this Master, students must have a good command of certain subjects. If this is not the case, they must add supplementary classes at the beginning of their Master's programme in order to obtain the prerequisites for these studies.

- Mandatory
- ⊗ Optional
- △ Not offered in 2021-2022
- ⊙ Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- 🌐 Open to international students
- 🚫 Not open to international students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Courses for students coming from a short bachelor. These students will have to take at least 105 credits to obtain the master in computer science.

○ LBIR1212	Probabilities and statistics (I)	Patrick Bogaert	FR [q1] [30h+15h] [5 Credits]
○ LINFO1114	Mathématiques discrètes	Marco Saerens	FR [q2] [30h+15h] [5 Credits]
○ LINFO1361	Artificial intelligence	Yves Deville	FR [q2] [30h+30h] [5 Credits]
○ LINFO1252	Systèmes informatiques	Etienne Riviere	FR [q1] [30h+30h] [5 Credits]
○ LINFO1341	Réseaux informatiques	Olivier Bonaventure	FR [q2] [30h+30h] [5 Credits]
○ LINFO1121	Algorithmique et structures de données	Pierre Schaus	FR [q1] [30h+30h] [5 Credits]
○ LINFO1115	Reasoning about a highly connected world: graph theory, game theory and networks	Peter Van Roy	EN [q2] [30h+30h] [5 Credits]
○ LINFO1123	Calculabilité, logique et complexité	Yves Deville	FR [q2] [30h+30h] [5 Credits]
○ LEPL1509	Projet 4 (en informatique)	Marc Lainez (compensates Yves Deville)	FR [q2] [30h+22.5h] [5 Credits]

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.

SINF2M1 - 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.

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](#)
- > [Admission and Enrolment Procedures for general registration](#)

Specific access requirements

This programme is taught in English with no prerequisite in French. The student is supposed to have at least a B2 level in the European Framework of Reference. A certificate is required for the holders of a non-Belgian degree, see [selection criteria](#) of the personalized access.

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			
Bachelier en sciences informatiques		Direct access	
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in de informatica		Direct access	
Foreign Bachelors			
Bachelor in Computer Sciences		Direct access	See "Personalized Access"

Non university Bachelors

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

Diploma	Access	Remarks
BA en informatique de gestion - EPS - crédits supplémentaires entre 30 et 60 BA en informatique de gestion - HE - crédits supplémentaires entre 30 et 60	Les enseignements supplémentaires éventuels peuvent être consultés dans le module complémentaire .	Type court

BA en informatique et systèmes (informatique industrielle) - EPS - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (informatique industrielle) - HE - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (réseaux et télécommunications) - EPS - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (réseaux et télécommunications) - HE - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (sécurité des systèmes) - HE - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (sécurité des systèmes) - EPS - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (technologie de l'informatique) - EPS - crédits supplémentaires entre 30 et 60

BA en informatique et systèmes (technologie de l'informatique) - HE - crédits supplémentaires entre 30 et 60

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			

Masters

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](#).

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).

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

International Openness (for UCLouvain students)

This Master's degree programme (60) does not allow for Erasmus/Socrates/Mercator exchange programmes. Students interested in international exchanges are urged to enrol in the 120 credit Master's degree programme in computer science.

International attraction (for foreign students)

The entire Master's degree programme is offered in English and knowledge of French is not necessary. Except for rare exceptions, courses are given in English. For non-Francophone students, alternative courses will be suggested by the programme commission as substitutes for required courses taught in French. This will be done on a case by case basis depending on the student's curriculum.

Possible trainings at the end of the programme

The 120 credit Master's degree programmes-accessible

The 60 credit Master's degree programme in computer science may be followed by the 120 credit Master's degree programme in computer science

Contacts

Curriculum Management

Entity

Structure entity
Denomination
Faculty
Sector
Acronym
Postal address

SST/EPL/INFO
(INFO)
Louvain School of Engineering (EPL)
Sciences and Technology (SST)
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Academic supervisor: [Pierre Schaus](#)

Jury

- Président du Jury: [Jean-Didier Legat](#)
- Secrétaire du Jury: [Pierre Schaus](#)

Useful Contact(s)

- Conseillère aux études: [Sofie De Pauw](#)

