

**At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In english**Dissertation/Graduation Project : **YES** - Internship : **optional**Activities in other languages : **YES**Activities on other sites : **NO**Main study domain : **Sciences**Organized by: **Ecole Polytechnique de Louvain (EPL)**Programme acronym: **sinf2m** - Francophone Certification Framework: 7**Table of contents**

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## SINF2M - Introduction

### Introduction

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#### 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 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

- scientists who know how to investigate a sharp problematic using scientific literature in the field;
- 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

- **required coursework** that seeks to give students the necessary skills to model and design complex applications (which is an indispensable part of the education of all university-trained computer scientists);
- **a major** selected by students that allows them to gain cutting edge knowledge in a field of their interest: software engineering and programming systems, artificial intelligence and big data, networks and security;
- **elective courses** that allow students to explore their interests whether it be computer science or another discipline (management, business creation, languages). As a comprehensive university, UCL has numerous courses of study;
- **a graduation project** that makes up half of the programme during the last year. It 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.

## SINF2M - 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
- innovate by integrating in computer systems elements linked to artificial intelligence, software engineering, and security networks
- work as part of multidisciplinary teams that take into account non-technical issues, be open to social sciences and the humanities to help with this task.

#### This programme is based on research:

UCL is a research university. The computer science research conducted at the institute ICTEAM is internationally recognised. Through the major courses offered in this Master's degree programme, students will be able to take advantage of cutting edge knowledge. In addition to providing fundamental knowledge, this programme is based on the in-depth understanding of concepts and the ability to think abstractly. These tools allow students to quickly adapt to the needs of companies. Moreover, this research may be continued through projects carried out at the doctoral level.

#### Applying concepts:

The application of concepts is a key part of this Master's degree programme. It is inconceivable that students can master theoretical concepts but not know how to apply them to a concrete problem. Thus, the programme includes a number of projects and studies, a large-scale graduation project and the possibility of completing an internship in a company.

#### International openness:

English is de facto the most used language in companies and those in the technical field in particular. This Master's degree programme is thus taught in English, which gives our students good speaking and writing skills. By offering a Master's degree in English, this programme demonstrates its international openness. The use of English allows the programme to welcome international students while at the same time immersing them in a French-speaking environment. It also increases the possibility of exchanges and dual diplomas with other (non-Belgian) universities.

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

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. A diversity of subjects are offered in the common curriculum and students specialise via a major:

- security networks;
- programming systems;
- 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 the 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 the 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. organise and carry out a study to understand a new problem in the field

3.1. Document and summarize the existing body of knowledge in the area under consideration

3.2. Propose a model and/or an experimental device in order to simulate or test a hypotheses relating to the phenomenon being studied

3.3. Write a cumulative report that explains the potential of the theoretical or technical innovations resulting from the research project

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

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

4.2. Collaborate on a work schedule, deadlines and roles

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

4.4. 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)

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

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The programme consists of four parts:

- a common curriculum, mainly the graduation project (36 credits).
- a final specialisation, required (30 credits).
- one or more majors allowing for specialisation in a field of computer science (20-54 credits).
- elective courses (0-54 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).

*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.*

> [Core courses for the Master's degree in computer science engineering](#) [ en-prog-2018-sinf2m-lsinf220t.html ]

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> [Professional focus](#) [ en-prog-2018-sinf2m-lsinf220s ]

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Options courses

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- > [Options en sciences informatiques](#) [ en-prog-2018-sinf2m-lsinf920r.html ]
  - > [Major in Artificial Intelligence: big data, optimization and algorithms](#) [ en-prog-2018-sinf2m-lsinf223o.html ]
  - > [Major in Software Engineering and Programming Systems](#) [ en-prog-2018-sinf2m-lsinf224o.html ]
  - > [Major in Security and Networking](#) [ en-prog-2018-sinf2m-lsinf225o.html ]
  - > [Data science and Applied Mathematics](#) [ en-prog-2018-sinf2m-lsinf226o.html ]
- > [Major in business creation and management](#) [ en-prog-2018-sinf2m-lsinf910r.html ]
  - > [Major: Business risks and opportunities](#) [ en-prog-2018-sinf2m-lsinf230o.html ]
  - > [Interfaculty major in small and medium sized business creation](#) [ en-prog-2018-sinf2m-lsinf227o.html ]
- > [Cours aux choix accessibles aux étudiants du master en sciences informatiques](#) [ en-prog-2018-sinf2m-lsinf930r.html ]
  - > [Elective courses](#) [ en-prog-2018-sinf2m-lsinf922o.html ]
  - > [Cours au choix en sciences informatiques](#) [ en-prog-2018-sinf2m-lsinf923o.html ]

## SINF2M Detailed programme

### Programme by subject

#### CORE COURSES

- Mandatory
- △ Courses not taught during 2018-2019
- ⊕ Periodic courses taught during 2018-2019
- ⊗ Optional
- ⊖ Periodic courses not taught during 2018-2019
- Activity with requisites

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

Year  
 1 2

#### ○ Final thesis (28 credits)

○ LSINF2990	Graduation project/End of studies project			28 Credits		x	x
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#### ○ Religion courses for students in exact sciences (2 credits)

The students choose one course between:  
 The student shall select

⊗ LTECO2100	Questions of religious sciences: Biblical readings	Hans Ausloos	15h	2 Credits	1q		x
⊗ LTECO2200	Questions of religious sciences: reflections about Christian faith	Dominique Martens	15h	2 Credits	2q		x
⊗ LTECO2300	Questions of religious sciences: questions about ethics	Marcela Lobo Bustamante	15h	2 Credits	1q		x

#### ○ Human Sciences

○ LFSA2210	Organisation and human resources	John Cultiaux	30h	3 Credits	2q	x	x
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#### ○ Computer science seminars

Students may choose 3 credits among  
 The student shall select 3 credits from amongst

⊗ LINGI2349	Networking and security seminar	Etienne Riviere Ramin Sadre (coord.)	30h	3 Credits	1q		x
⊗ LINGI2359	Software engineering and programming systems seminar	Axel Legay	30h	3 Credits	1q		x
⊗ LINGI2369	Artificial intelligence and machine learning seminar	Yves Deville (compensates Pierre Dupont) Pierre Dupont Siegfried Nijssen Pierre Schaus (compensates Pierre Dupont)	30h	3 Credits	1q		x

**PROFESSIONAL FOCUS [30.0]**

● Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

*Students must take all final specialisation courses.*

Year

1 2

**○ Computer science courses**

○ LINGI2132	<a href="#">Languages and translators</a>	Pierre Schaus	30h+30h	6 Credits	2q	x	x
○ LINGI2172	<a href="#">Databases</a>	Siegfried Nijssen	30h+30h	6 Credits	2q	x	x
○ LINGI2241	<a href="#">Architecture and performance of computer systems</a>	Ramin Sadre	30h+30h	6 Credits	1q	x	x
○ LINGI2261	<a href="#">Artificial intelligence: representation and reasoning</a>	Yves Deville	30h+30h	6 Credits	1q	x	x
○ LINGI2255	<a href="#">Software engineering project</a>	Kim Mens	30h+30h	6 Credits	1q	x	x

## OPTIONS

Students must complete their programme with major and or elective courses. They may select 54 credits from among the following courses:

### Options en sciences informatiques

- > Major in Artificial Intelligence: big data, optimization and algorithms [ en-prog-2018-sinf2m-lsinf223o ]
- > Major in Software Engineering and Programming Systems [ en-prog-2018-sinf2m-lsinf224o ]
- > Major in Security and Networking [ en-prog-2018-sinf2m-lsinf225o ]
- > Data science and Applied Mathematics [ en-prog-2018-sinf2m-lsinf226o ]

### Major in business creation and management

- > Major: Business risks and opportunities [ en-prog-2018-sinf2m-lsinf230o ]
- > Interfaculty major in small and medium sized business creation [ en-prog-2018-sinf2m-lsinf227o ]

### Cours aux choix accessibles aux étudiants du master en sciences informatiques

- > Elective courses [ en-prog-2018-sinf2m-lsinf922o ]
- > Cours au choix en sciences informatiques [ en-prog-2018-sinf2m-lsinf923o ]

## OPTIONS EN SCIENCES INFORMATIQUES

### MAJOR IN ARTIFICIAL INTELLIGENCE: BIG DATA, OPTIMIZATION AND ALGORITHMS

Students completing the major in Artificial Intelligence: big data, optimization and algorithms will be able to: Identify and implement methods and techniques that allow software to solve complex problems that when solved by humans require "intelligence", Understand and put to good use methods and techniques relating to artificial intelligence such as automatic reasoning, research and heuristics, acquisition and representation of knowledge, automatic learning, problems associated with overcoming constraints, Identify applications and its methods and tools; understand a particular category of applications and its related techniques, for example robotics, computer vision, planning, data mining, computational linguistics and bioinformatics, big data processing, Formalise and structure a body of complex knowledge and use a systematic and rigorous approach to develop quality "intelligence" systems.

● Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

The student shall select

De 20 à 30 CREDITS parmi

Year

1 2

#### ● Required courses in Artificial Intelligence: big data, optimization and algorithms

Course ID	Course Title	Instructor	Hours	Credits	Year 1	Year 2
● LINGI2262	Machine Learning :classification and evaluation	Pierre Dupont	30h+30h	5 Credits	2q	X X
● LINGI2263	Computational Linguistics	Pierre Dupont Cédric Fairon	30h+15h	5 Credits	1q	X X
● LINGI2266	Advanced Algorithms for Optimization	Pierre Schaus	30h+15h	5 Credits	1q	X X
● LINGI2365	Constraint programming	Pierre Schaus Pierre Schaus (compensates Yves Deville)	30h+15h	5 Credits	2q	X X

#### ⊗ Elective courses in Artificial Intelligence

The student select 10 credits among

						Year	
						1	2
⊗ LELEC2870	Machine Learning : regression, dimensionality reduction and data visualization	John Lee (compensates Michel Verleysen) Michel Verleysen	30h+30h	5 Credits	1q	x	x
⊗ LELEC2885	Image processing and computer vision	Christophe De Vleeschouwer (coord.) Laurent Jacques	30h+30h	5 Credits	1q	x	x
⊗ LGBIO2010	Bioinformatics	Pierre Dupont	30h+30h	5 Credits	2q	x	x
⊗ LINGI2145	Cloud Computing	Etienne Riviere	30h+15h	5 Credits	1q	x	x
⊗ LINGI2364	Mining Patterns in Data	Siegfried Nijssen	30h+15h	5 Credits	1q	x	x
⊗ LINMA1691	Discrete mathematics - Graph theory and algorithms	Vincent Blondel Jean-Charles Delvenne Raphaël Jungers (compensates Jean-Charles Delvenne) Raphaël Jungers (compensates Vincent Blondel)	30h +22.5h	5 Credits	1q	x	x
⊗ LINMA1702	Optimization models and methods I	François Glineur	30h +22.5h	5 Credits	2q	x	x
⊗ LINMA2450	Combinatorial optimization	Daniele Catanzaro (compensates Jean-Charles Delvenne) Daniele Catanzaro (compensates Julien Hendrickx) Jean-Charles Delvenne (coord.) Julien Hendrickx	30h +22.5h	5 Credits	1q	x	x
⊗ LINMA2472	Algorithms in data science	Vincent Blondel Jean-Charles Delvenne (coord.) Gautier Krings (compensates Vincent Blondel) Leto Peel (compensates Jean-Charles Delvenne)	30h +22.5h	5 Credits	1q	x	x
⊗ LSINF2275	Data mining & decision making	Marco Saerens	30h+15h	5 Credits	2q	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

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

The student shall select

De 20 à 30 CREDITS parmi

Year

1 2

**○ Required courses in software engineering and programming systems**

○ LINGI2143	<a href="#">Concurrent systems : models and analysis</a>	Charles Pecheur	30h+15h	5 Credits	1q	x	x
○ LINGI2251	<a href="#">Software Quality Assurance</a>	Charles Pecheur	30h+15h	5 Credits	2q	x	x
○ LINGI2252	<a href="#">Software Maintenance and Evolution</a>	Kim Mens	30h+15h	5 Credits	1q	x	x
○ LSINF2345	<a href="#">Languages and algorithms for distributed Applications</a>	Peter Van Roy	30h+15h	5 Credits	2q	x	x

**⊗ Elective courses in Software Engineering and Programming Systems**

The student can select 10 credits among

⊗ LINGI2145	<a href="#">Cloud Computing</a>	Etienne Riviere	30h+15h	5 Credits	1q	x	x
⊗ LINGI2347	<a href="#">Computer system security</a>	Ramin Sadre	30h+15h	5 Credits	2q	x	x
⊗ LINGI2355	<a href="#">Multicore programming</a>	Etienne Riviere	30h+15h	5 Credits	2q	x	x
⊗ LINGI2364	<a href="#">Mining Patterns in Data</a>	Siegfried Nijssen	30h+15h	5 Credits	1q	x	x
⊗ LINGI2365	<a href="#">Constraint programming</a>	Pierre Schaus Pierre Schaus (compensates Yves Deville)	30h+15h	5 Credits	2q	x	x
⊗ LSINF2335	<a href="#">Programming paradigms</a>	Kim Mens	30h+15h	5 Credits	2q	x	x
⊗ LSINF2382	<a href="#">Computer supported collaborative work</a>	Jean Vanderdonckt	30h+15h	5 Credits	2q	x	x

**MAJOR IN SECURITY AND NETWORKING**

Students completing the major "Security and Networking" will be able to: Understand and explain different devices and protocols used in computer networking; Design, configure and manage computer networks while taking into account application needs; Identify large scale distributed and parallel applications, the problems occurring with these applications and propose solutions; Carry out distributed applications by implementing the appropriate techniques; Understand the characteristics of distributed systems: parallelism, synchronisation, communication, error and threat models; Use appropriate techniques, algorithms and languages to design, model and analyse distributed applications; Understand and implement mechanisms (cryptography, protocols) to secure networks and distributed systems.

○ Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊙ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

*The student shall select  
De 20 à 30 CREDITS parmi*

Year

1 2

**○ Required courses in Networking and Security**

Course ID	Course Title	Instructor	Hours	Credits	Year 1	Year 2
○ LINGI2142	<a href="#">Computer networks: configuration and management</a>	Olivier Bonaventure	30h+30h	5 Credits	1q	x x
○ LINGI2145	<a href="#">Cloud Computing</a>	Etienne Riviere	30h+15h	5 Credits	1q	x x
○ LINGI2146	<a href="#">Mobile and Embedded Computing</a>	Ramin Sadre	30h+15h	5 Credits	2q	x x
○ LINGI2347	<a href="#">Computer system security</a>	Ramin Sadre	30h+15h	5 Credits	2q	x x

**⊗ Elective courses in Networking and Security**

*The student can select 10 credits amongst*

⊗ LINGI2143	<a href="#">Concurrent systems : models and analysis</a>	Charles Pecheur	30h+15h	5 Credits	1q	x x
⊗ LINGI2144	<a href="#">Secured systems engineering</a>	Axel Legay	30h+15h	5 Credits	2q	x x
⊗ LINGI2315	<a href="#">Design of Embedded and real-time systems</a>	Jean-Didier Legat	30h+30h	5 Credits	2q	x x
⊗ LINGI2348	<a href="#">Information theory and coding</a>	Christophe De Vleeschouwer (compensates) Benoît Macq Jérôme Louveaux Benoît Macq Olivier Pereira	30h+15h	5 Credits	2q	x x
⊗ LINMA2470	<a href="#">Stochastic modelling</a>	Philippe Chevalier	30h +22.5h	5 Credits	2q	x x
⊗ LMAT2450	<a href="#">Cryptography</a>	Olivier Pereira	30h+15h	5 Credits	1q	x x
⊗ LSINF2345	<a href="#">Languages and algorithms for distributed Applications</a>	Peter Van Roy	30h+15h	5 Credits	2q	x x
⊗ LINGI2355	<a href="#">Multicore programming</a>	Etienne Riviere	30h+15h	5 Credits	2q	x x
⊗ LELEC2770	<a href="#">Privacy Enhancing technology</a>	Olivier Pereira (coord.) François-Xavier Standaert	30h+30h	5 Credits	1q	x x

**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; Identify and implement models and techniques relating to statistics, machine learning and data mining; learn classes of applications such as the treatment of noisy data, pattern recognition or automatic extraction in large data collections.

○ Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

*This option is limited to students who have taken the INFO/MAP major/minor pairing or the SINP Bachelor's degree program with the equivalent of a minor in mathematics. The student shall select De 20 à 30 CREDITS parmi*

Year

1 2

**○ Required courses in Computing and Applied Mathematics**

○ LINGI2262	<a href="#">Machine Learning :classification and evaluation</a>	Pierre Dupont	30h+30h	5 Credits	2q	x	x
○ LINMA2472	<a href="#">Algorithms in data science</a>	Vincent Blondel Jean-Charles Delvenne (coord.) Gautier Krings (compensates Vincent Blondel) Leto Peel (compensates Jean-Charles Delvenne)	30h +22.5h	5 Credits	1q	x	x
○ LINMA2710	<a href="#">Scientific computing</a>	Pierre-Antoine Absil (coord.) Anthony Papavasiliou Dirk Roose (compensates Anthony Papavasiliou)	30h +22.5h	5 Credits	2q	x	x
○ LSINF2275	<a href="#">Data mining &amp; decision making</a>	Marco Saerens	30h+15h	5 Credits	2q	x	x

**⊗ Elective courses in computing and applied mathematics**

The student can select 10 credits amongst

⊗ LELEC2870	<a href="#">Machine Learning : regression, dimensionality reduction and data visualization</a>	John Lee (compensates Michel Verleysen) Michel Verleysen	30h+30h	5 Credits	1q	x	x
⊗ LINGI2266	<a href="#">Advanced Algorithms for Optimization</a>	Pierre Schaus	30h+15h	5 Credits	1q	x	x
⊗ LINGI2348	<a href="#">Information theory and coding</a>	Christophe De Vleeschouwer (compensates Benoît Macq) Jérôme Louveaux Benoît Macq Olivier Pereira	30h+15h	5 Credits	2q	x	x
⊗ LINGI2364	<a href="#">Mining Patterns in Data</a>	Siegfried Nijssen	30h+15h	5 Credits	1q	x	x
⊗ LINGI2365	<a href="#">Constraint programming</a>	Pierre Schaus Pierre Schaus (compensates Yves Deville)	30h+15h	5 Credits	2q	x	x
⊗ LINMA2450	<a href="#">Combinatorial optimization</a>	Daniele Catanzaro (compensates Jean-Charles Delvenne) Daniele Catanzaro (compensates Julien Hendrickx) Jean-Charles Delvenne (coord.) Julien Hendrickx	30h +22.5h	5 Credits	1q	x	x
⊗ LINMA2470	<a href="#">Stochastic modelling</a>	Philippe Chevalier	30h +22.5h	5 Credits	2q	x	x
⊗ LINMA2471	<a href="#">Optimization models and methods II</a>	François Glineur	30h +22.5h	5 Credits	1q	x	x

						Year	
						1	2
⌘ LMAT2450	Cryptography	Olivier Pereira	30h+15h	5 Credits	1q	x	x
⌘ LMECA2170	Numerical Geometry	Vincent Legat Jean-François Remacle	30h+30h	5 Credits	1q	x	x

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**MAJOR IN BUSINESS CREATION AND MANAGEMENT****MAJOR: BUSINESS RISKS AND OPPORTUNITIES**

This major is not available in English and may not be taken at the same time as the major "Interdisciplinary program in entrepreneurship - CPME"

○ Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

*The student who chooses this option shall select*

*De 16 à 20 CREDITS parmi*

						Year	
						1	2
○ LFSA1290	<a href="#">Introduction to financial and accounting management</a>	André Nsabimana (compensates Gerrit Sarens) Gerrit Sarens	30h+15h	4 Credits	2q	x	x
○ LFSA2140	<a href="#">Elements of law for industry and research</a>	Vincent Cassiers Werner Derijcke Bénédicte Inghels	30h	3 Credits	1q	x	x
○ LFSA2210	<a href="#">Organisation and human resources</a>	John Cultiaux	30h	3 Credits	2q	x	x
○ LFSA2230	<a href="#">Introduction to management and to business economics</a>	Benoît Gailly	30h+15h	4 Credits	2q	x	x
○ LFSA2245	<a href="#">Environment and business</a>	Thierry Bréchet Jean-Pierre Tack (compensates Thierry Bréchet)	30h	3 Credits	1q	x	x

**○ One course between**

*De 3 à 5 CREDITS parmi*

⊗ LFSA2202	<a href="#">Ethics and ICT</a>	Axel Gosseries Olivier Pereira	30h	3 Credits	2q	x	x
⊗ LLSMS2280	<a href="#">Business Ethics and Compliance Management</a>	Carlos Desmet	30h	5 Credits	1q	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.

## INTERFACULTY MAJOR IN SMALL AND MEDIUM SIZED BUSINESS CREATION

In keeping with most of the Masters' degrees in civil engineering, the goal of this major is to familiarize the civil engineering student with the specifics of entrepreneurship and business development in order to develop the necessary abilities, knowledge and tools to create a business. It is a truly interdisciplinary initiative where students from different faculties are brought together in cross-disciplinary teams to create an entrepreneurial project. The Interdisciplinary program in entrepreneurship (CPME) is spread over two years and is integrated into more than 20 Masters (8 faculties). The program includes a collective and interdisciplinary master thesis focused on an entrepreneurial project (start-up or spin-off) and realized in teams of 3 to 4 students from 3 to 4 different faculties. The access is reserved for a small number of students by a selection procedure. Additional information may be found at [www.uclouvain.be/cpme](http://www.uclouvain.be/cpme) This major is not available in English and may not be taken at the same time as the major "Business risks and opportunities".

● Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

Further information about this major may be found at <http://www.uclouvain.be/cpme>. This major may not be taken at the same time as a major in management. Students in this major may choose 20-25 credits from the following courses:  
De 20 à 25 CREDITS parmi

Year

1 2

### ○ Required courses for the major in small and medium sized businesses

Course ID	Course Title	Instructor	Hours	Credits	Year 1	Year 2	Year 3
○ LCPME2001	<a href="#">Entrepreneurship Theory (in French)</a>	Frank Janssen	30h+20h	5 Credits	1q	x	
○ LCPME2002	<a href="#">Managerial, legal and economic aspects of the creation of a company (in French)</a>	Yves De Cordt Marine Falize	30h+15h	5 Credits	1q	x	x
○ LCPME2003	<a href="#">Business plan of the creation of a company (in French)</a> <i>Les séances du cours LCPME2003 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.</i>	Julie Hermans Frank Janssen	30h+15h	5 Credits	2q		x
○ LCPME2004	<a href="#">Advanced seminar on Entrepreneurship (in French)</a>	Roxane De Hoe Frank Janssen	30h+15h	5 Credits	2q	x	x

### ⊗ Prerequisite CPME courses

Student who have not taken management courses during their previous studies must enroll in LCPME2000.

○ LCPME2000	<a href="#">Venture creation financement and management I</a>	Yves De Rongé Olivier Giacomini	30h+15h	5 Credits	1q	x	
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## COURS AUX CHOIX ACCESSIBLES AUX ÉTUDIANTS DU MASTER EN SCIENCES INFORMATIQUES

### ELECTIVE COURSES

- Mandatory  
 △ Courses not taught during 2018-2019  
 ⊕ Periodic courses taught during 2018-2019  
 ☒ Optional  
 ⊖ Periodic courses not taught during 2018-2019  
 ■ Activity with requisites

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

De 3 à 21 CREDITS parmi

Year

1 2

### o Compétences transversales et contact avec l'entreprise

L'étudiant choisit minimum 3 crédits parmi un stage, un ou plusieurs cours de l'option "Enjeux de l'entreprise", l'option "CPME", une UE d'activité professionnelle liée à la discipline  
 Min=3 credits parmi

#### ☒ Internship

☒ LFSA2995	Company Internship	Jean-Pierre Raskin	30h	10 Credits	1 + 2q	x	x
☒ LFSA2996	Company Internship			5 Credits	1 + 2q	x	x

#### ☒ Professional integration activity specific to the program

☒ LINGI2399	Industrial seminar in computer science	Yves Deville Bernard Geubelle	30h	3 Credits	2q	x	x
☒ LINGI2402	Open Source Project			5 Credits		x	x

### ☒ Communication

L'étudiant choisit maximum 8 crédits visant le développement de ses compétences de communication  
 Max=8 CREDITS parmi

#### ☒ 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	Ann Rinder (coord.)	30h	3 Credits	1 + 2q	x	x
☒ LALLE2501	Professional development seminar-German	Ann Rinder (coord.)	30h	5 Credits	1 + 2q	x	x
☒ LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	30h	3 Credits	1q	x	x
☒ LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	30h	5 Credits	1q	x	x
☒ LNEER2500	Seminar of Entry to professional life in Dutch - Intermediate level	Isabelle Demeulenaere (coord.) Mariken Smit Quentin Zèques	30h	3 Credits	1 ou 2q	x	x
☒ LNEER2600	Seminar of entry to professional life in Dutch - Upper-Intermediate level	Isabelle Demeulenaere (coord.)	30h	3 Credits	1 ou 2q	x	x

#### ☒ Group dynamics

☒ LEPL2351	Dynamique des groupes - Q1	Laurent Francis Benoît Raucent Piotr Sobieski (coord.) Vincent Wertz	15h+30h	3 Credits	1q	x	x
☒ LEPL2352	Dynamique des groupes - Q2	Laurent Francis Benoît Raucent Piotr Sobieski (coord.) Vincent Wertz	15h+30h	3 Credits	2q	x	x

Year

1 2

⌘ **Autre UE non disciplinaires**

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*L'étudiant peut proposer maximum 8 crédits d'ouverture vers d'autres disciplines (maximum un cours BEST ou des UE hors EPL).  
Max=8 CREDITS parmi*

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## COURS AU CHOIX EN SCIENCES INFORMATIQUES

● Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

						Year	
						1	2
⊗ LINGI2401	<a href="#">Open Source strategy for software development</a>	Lionel Dricot	30h+15h	5 Credits	1q	x	x
⊗ LINGI2402	<a href="#">Open Source Project</a>			5 Credits		x	x

## Course prerequisites

A document entitled (nb: [not available](#) for this programme [sinf2m](#)) specifies the activities (course units - CU) with one or more prerequisite(s) within the study programme, that is the CU whose learning outcomes must have been certified and for which the credits must have been granted by the jury before the student is authorised to sign up for that activity.

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

As the prerequisites are a requirement of enrolment, there are none within a year of a course.

The prerequisites are defined for the CUs for different years and therefore influence the order in which the student can enrol in the programme's CUs.

In addition, when the panel validates a student's individual programme at the beginning of the year, it ensures the consistency of the individual programme:

- It can change a prerequisite into a corequisite within a single year (to allow studies to be continued with an adequate annual load);
- It can require the student to combine enrolment in two separate CUs it considers necessary for educational purposes.

For more information, please consult [regulation of studies and exams](#).

## The programme's courses and learning outcomes

For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies the competences expected of every graduate on completion of the programme. You can see the contribution of each teaching unit to the programme's reference framework of learning outcomes in the document *"In which teaching units are the competences and learning outcomes in the programme's reference framework developed and mastered by the student?"*

## SINF2M - Information

### Admission

*General* (<https://uclouvain.be/en/study/inscriptions/admission-requirements-master-s-degree.html>) and specific admission requirements for this program must be satisfied at the time of enrolling at the university.

#### SUMMARY

- > [Specific Admission Requirements](#)
- > [University Bachelors](#)
- > [Non university Bachelors](#)
- > [Holders of a 2nd cycle University degree](#)
- > [Holders of a non-University 2nd cycle degree](#)
- > [Adults taking up their university training](#)
- > [Access on the file](#)
- > [Admission and Enrolment Procedures for general registration](#)

### Specific Admission 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
<b>UCLouvain Bachelors</b>			
<a href="#">Bachelor in Computer Science</a>		Direct Access	
<a href="#">Bachelor in Economics and Management</a> <a href="#">Bachelor in Mathematics</a> <a href="#">Bachelor in Engineering : Architecture</a>	Minor in computer science	Access with additional training	maximum 60 <a href="#">additional credits</a> integrated into their Master's degree programme
<b>Others Bachelors of the French speaking Community of Belgium</b>			
Bachelor in computer science		Direct Access	
<b>Bachelors of the Dutch speaking Community of Belgium</b>			
Bachelor in de informatica		Direct Access	
<b>Foreign Bachelors</b>			
Bachelor in computer science		Based on application: accepted, conditional on further training, or refusal	See "Personalized Access"

#### Non university Bachelors

> Find out more about [links](https://uclouvain.be/fr/etudier/passereelles) (<https://uclouvain.be/fr/etudier/passereelles>) to the university

Diploma	Access	Remarks
BA en informatique de gestion - EPS - crédits supplémentaires entre 30 et 60	Les enseignements supplémentaires éventuels peuvent être consultés dans <a href="#">le module complémentaire</a> .	Type court
BA en informatique de gestion - HE - crédits supplémentaires entre 30 et 60		
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
<b>"Licenciés"</b>			
"Licencié en informatique"		-	
<b>Masters</b>			
Master in computer science		-	

## Holders of a non-University 2nd cycle degree

### Adults taking up their university training

> See the website [Valorisation des acquis de l'expérience](https://uclouvain.be/fr/etudier/vae) (https://uclouvain.be/fr/etudier/vae)

It is possible to gain admission to all masters courses via the validation of professional experience procedure.

### Access on the file

Reminder : all Masters (apart from Advanced Masters) are also accessible on file.

The first step of the admission procedure requires to submit an application online : <https://uclouvain.be/en/study/inscriptions/futurs-etudiants.html> (https://uclouvain.be/en/study/inscriptions/futurs-etudiants.html). Selection criteria are [summarized here](#).

## Admission and Enrolment Procedures for general registration

## Supplementary classes

**To enrol for this Masters, the student must have a good command of certain subjects. If this is not the case, they must add preparatory modules to their Master's programme.**

○ Mandatory

△ Courses not taught during 2018-2019

⊕ Periodic courses taught during 2018-2019

⊗ Optional

⊖ Periodic courses not taught during 2018-2019

■ Activity with requisites

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

*Courses for students coming from bachelor in "informatique de gestion" or "informatique et systèmes". These students will have to take at least 150 credits to obtain the master in computer science.*

○ LBIR1212	<a href="#">Probabilities and statistics (I)</a>	Patrick Bogaert	30h+15h	4 Credits	1q
○ LBIR1315	<a href="#">Probability and statistics II</a>	Patrick Bogaert	22.5h+22.5h	3 Credits	1q
○ LINGI1101	<a href="#">Discrete mathematics: logical foundations of computing science</a>	Peter Van Roy	30h+30h	5 Credits	1q
○ LINGI1122	<a href="#">Program conception methods</a>	Charles Pecheur	30h+30h	5 Credits	2q
○ LINGI1123	<a href="#">Computability and complexity</a>	Yves Deville	30h+30h	5 Credits	2q
○ LINGI1131	<a href="#">Computer language concepts</a>	Peter Van Roy	30h+30h	5 Credits	2q
○ LINGI1341	<a href="#">Computer networks</a>	Olivier Bonaventure	30h+30h	5 Credits	1q
○ LSINF1121	<a href="#">Algorithmics and data structures</a>	Pierre Schaus	30h+30h	5 Credits	1q
○ LSINF1250	<a href="#">Mathematics for computer science</a>	Marco Saerens	30h+15h	7 Credits	1q

## Teaching method

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### 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

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***The evaluation methods comply with the regulations concerning studies and exams (<https://uclouvain.be/fr/decouvrir/rgee.html>). 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 (<https://uclouvain.be/en-enseignement-reglements.html>)), 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.

## Possible trainings at the end of the programme

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-Accessible supplementary masters : not applicable.

-Accessible doctoral programmes:

The master in computer science engineering opens access to a Doctorate in Engineering (doctorat en sciences appliquées). In this context, doctoral students are enrolled in one of the thematic doctoral schools.

## Contacts

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***Attention, you are currently reading an archived page: below contact informations were for program study 2018-2019 only. To get current contact informations please got to [current program study site](#).***

## Curriculum Management

Entity	
Structure entity	SST/EPL/INFO
Denomination	( <a href="https://uclouvain.be/repertoires/entites/info">INFO</a> ) ( <a href="https://uclouvain.be/repertoires/entites/info">https://uclouvain.be/repertoires/entites/info</a> )
Faculty	Louvain School of Engineering ( <a href="https://uclouvain.be/repertoires/entites/epl">EPL</a> ) ( <a href="https://uclouvain.be/repertoires/entites/epl">https://uclouvain.be/repertoires/entites/epl</a> )
Sector	Sciences and Technology ( <a href="https://uclouvain.be/repertoires/entites/sst">SST</a> ) ( <a href="https://uclouvain.be/repertoires/entites/sst">https://uclouvain.be/repertoires/entites/sst</a> )
Acronym	INFO
Postal address	Place Sainte Barbe 2 - bte L5.02.01 1348 Louvain-la-Neuve Tel: <a href="tel:+32210473150">+32 (0) 10 47 31 50</a> - Fax: <a href="tel:+32210450345">+32 (0) 10 45 03 45</a>
Academic supervisor: Kim Mens	
Jury	
	<ul style="list-style-type: none"><li>• Jean-Didier Legat</li></ul>
Useful Contact(s)	
	<ul style="list-style-type: none"><li>• Chantal Poncin</li></ul>

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