**SINF1BA**

*2021 - 2022*

# Bachelor in Computer Science

**At Louvain-la-Neuve - 180 credits - 3 years - Day schedule - In French**
Dissertation/Graduation Project : **NO** - 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: **SINF1BA** - Francophone Certification Framework: 6

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SINF1BA -  Introduction

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# Introduction

### Introduction

Computer science, or more generally information and communications technology (ICT), is everywhere; everyone uses computers/ smartphones/… to communicate, work, study, play, travel, and manage. More and more activities are assisted by computers. SMEs, public services, education world, associations, leisure, in two words the world, has a growing need for computer scientists who are competent, creative and motivated. We cannot count the daily-used IT systems: Internet, mobile, social networks, robotics, home automation, e-commerce, search engines, business management, hospitals, road safety, exhibitions and management of theatres or museums, transport, energy supply and many other areas rely on IT. There will be more and more areas impacted by ICT tomorrow and more complex applications will be needed.

With the bachelor's degree in computer science, you will

• understand in depth the foundations for the design and implementation of simple computer applications;

• master the basic underlying computer technologies;

• have developed your ability for reasoning and abstraction, required to design future applications;

• master the mathematical techniques involved in such reasoning;

• get the luggage necessary for the future "master in computer science," oriented toward the development of complex software applications.

### Your profile

You

• have a taste for problem solving;

• are pushed by a great curiosity;

• overflow of creativity and imagination;

• are a head for abstraction, analysis and synthesis;

• have a methodical mind and show rigor in your reasoning;

• are good for human contact, organization of teamwork, leadership, etc.

Following a strong mathematical option during high school and feeling an attraction to science or economics are assets.

### Your future job

During his career, the computer scientist will flourish and evolve in one or more of the following profiles:

• The designer identifies the needs of the future user and determines the technical means useful to fulfil these needs. He is able to speak "the language" of the customer, it has a fairly broad culture to interact successfully with non-computer experts. He masters computer technology to identify the best solution. It builds a quality architecture for this solution.

• The achiever is able to translate the indications and guidelines produced by the designer in computer components. He analyses in detail some components of the architecture, he programs, tests, deploys these components into an integrated solution. His technical expertise is very sharp.

• The IT project manager takes care of the smooth running of the project; he is responsible for the completion of the tasks associated with these systems, their safety, planning their development. As the designer, it has qualities in terms of human contacts, a good general education and strong technical skills.

### Your programme

The bachelor has a compulsory part covering different disciplines

• computer science ;

• mathematics ;

• economics, management and social sciences;

• English;

• sciences and technology.

You choose a minor to complete your training. This option allows to open your study program to domains you are interested outside the computer science or to deepen some fields closer to the mandatory part of the program (computer science or management).

Once bachelor, you will continue your training by the Master in Computer Science.

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**SINF1BA -  Teaching profile**

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## Learning outcomes

General objectives

This bachelor's programme offers a general approach to computer science in the context of basic university training. The bachelor's programme leads to the title of " Bachelor of Computer Science" and upon completion of this first cycle of studies, the student will be granted access to the master's programme in Computer Science.

This university-level training in computer science prepare future specialists capable of creating and elaborating complex and efficient computing systems that satisfy the numerous and ever-increasing needs in our society. It thus trains "software creators" rather than pure programmers. More specifically, the bachelor's programme in computer science aims at the acquisition of the following technical competences and skills :

- Gaining an in-depth understanding of the basic essentials needed to design and implement simple software systems;
- Mastering the underlying foundations of computer science;
- Developing the reasoning and abstraction abilities necessary for the creation of such systems;
- Mastering the mathematical skills needed to carry out such reasoning;
- Acquisition of the knowledge and skills necessary for the future " master's in computer science" which will be orientated towards the engineering of more complex software system;
- Acquisition of a lasting 'know-how', readily adaptable to the continuously evolving field of computer science; learning how to learn.

Computer science comprises the theoretical knowledge and practical skills needed to develop and understand complex software systems.  In addition to this technical and more applied knowledge, to become a professional computer scientist, the student has to develop some extra skills such as a creative ability and critical mindset.  These studies also train students to become responsible young professionals, capable of apprehending the complex socio-economic world into which computing science is embedded, and to take decisions which are both technically sound and humanly responsible.  The bachelor's programme in computer science thus aims at the acquisition of other competences, such as :

- Understanding the mechanisms which govern the socio-economic and/or technical environment in which a given computer system has to be deployed;
- Integration of the acquired technical competences and skills in a multidisciplinary context;
- Developing an intellectual curiosity, an analytic mind, a capacity for critical reflection, sound communication skills and the ability to organise and manage one's studies.

Objectives of the foundation studies
The objective of the basic university-level studies is to allow the student to acquire essential competences and skills in the areas of computer science, mathematics, science and technology, economics and management, human sciences and English.

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

1. demonstrate a solid basic knowledge of computer science, which, being supplemented by a solid education in other areas, allows him to solve problems within his discipline

The bachelor's program aims the acquisition of knowledge in :

• Discrete structures;

• Programming Fundamentals;

• Algorithms and Complexity;

• Architecture of computers and operating systems;

• Program Design Method;

• Information management.

Moreover, the bachelor's program is open to other disciplines. A solid basic education is offered in the following areas:

• Mathematics to model a situation and prove the accuracy of a statement;

• Statistics to be able to make a quantitative analysis of data;

• Economics, management and humanities to understand the socio-economic world in which IT tools are inserted.

2. to organize and carry out successfully the development process of a "classic" computer system with medium complexity in order to meet the customer's needs

• Analyse the problem, identify the functional requirements and formulate the corresponding specifications;

• Model the problem and design one or more technical solutions to meet these specifications;

• Assess and classify these solutions in the light of all the criteria listed in the specifications: effectiveness, feasibility;

• Implement and test the selected solution.

3. contribute in team to a project taking into account the objectives, allocated resources and constraints on feature

• Crop and clarify the objectives of a project in collaboration with customers;

• Commit collectively on a work plan, schedule and roles to keep;

• Make decisions as a team when there is a choice to make: either on technical solutions or on the organization of work to make the project.

4. communicate effectively in French orally and in writing to carry out the projects, use cleverly technical documents in English and understand the information transmitted orally in English

• Identify the needs of the customer who has a basic computer science culture: questioning, listening and understanding the client, keeping in mind the existence of non-technical dimensions;

• Argue and convince while adapting his communication to the language of the interlocutors: colleagues, clients, superiors;

• Communicate in graphical and schematic form, interpret a diagram, present the results of a task, structuring information;

• Read, analyse and use technical documentation (diagrams, tutorials, ...);

• Prepare written documents taking into account contextual requirements and social conventions (manual, documentation, project report);

• Make a persuasive oral presentation using modern communication techniques.

5. demonstrate both rigorous, open and critical mind in his work

• Apply the standards of its discipline (terminology, quality standards in terms of documentation and programming methods, ...);

• Demonstrate critical attitude with respect to a technical solution, checking robustness and relevance in its context of use;

• Develop autonomously learning to remain competent in his field.


## Programme structure

The student who enrols in the bachelor's programme in Computer Science will follow a programme of 180 credits, usually spread over 3 years. This programme entitles access to the corresponding master's programme in Computer Science, which is a programme of 120 credits, usually spread over 2 years.

The programme includes a major of 150 credits and a minor of 30 credits.

- The major consists of a set of polyvalent courses of 80 credits in total and a set of Computer Science courses of 70 credits.  The general polyvalent formation comprises a solid training in Economics, Management and Human Sciences (30 credits) as well as in Mathematics (32 credits).
- Regarding the minor, UCL university proposes a large variety of minors in sciences (statistics, scientific culture,...) as well as in human sciences (philosophy, economy,...).  For more details, please consult the following web-page : https://uclouvain.be/programme-mineures.html. Whereas, some minors are freely accessible by any student, some others are subject to certain accessibility conditions.  When a student would like to access a minor but encounters certain problems, he or she is advised to contact his or her student counsellor.


The principal subjects addressed in this programme are :

- Computer Science - 70 credits
- Mathematics- 32 credits
- Economics, Management and Human sciences - 30 credits
- Science and Techniques - 11 credits
- English - 7 credits
- Minor - 30 credits

The computer-science courses adhere to those of the standard curricula proposed by international standard organisations in the domain (ACM and IEEE).


## SINF1BA Programme


## Detailed programme by subject

⭘ 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
[FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

**Year**

| | | **1** | **2** | **3** |

## ⭘ *Core study*

### ⭘ General and training (80 credits)

#### ⭘ Mathematics (32 credits)

| | | | | | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| ⭘ LBIR1212 | Probabilities and statistics (I) 🟨 | Patrick Bogaert | [FR] | [q1] [30h+15h] [4 Credits] | | x | |
| ⭘ LEPL1109 | Statistics and data sciences 🟨 | Donatien Hainaut<br>Laurent Jacques | [FR] | [q1] [30h+30h] [5 Credits] | | | x |
| ⭘ LINFO1111 | Analysis | François Glineur<br>Roland Keunings | [FR] | [q1] [45h+37.5h] [7 Credits] | x | | |
| ⭘ LINFO1112 | Algebra | Christophe Craeye<br>Thomas Peters<br>(compensates<br>Enrico Vitale) | [FR] | [q2] [30h+30h] [5 Credits] | x | | |
| ⭘ LINFO1113 | Numerical algorithmic 🟨 | Loïc Quertenmont | [FR] | [q1] [30h+30h] [6 Credits] | | x | |
| ⭘ LINFO1114 | Discrete mathematics 🟨 | Marco Saerens | [FR] | [q2] [30h+15h] [5 Credits] | | x | |

#### ⭘ Scientific and technical Courses (10 credits)

| | | | | | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| ⭘ LELEC1930 | Intoduction to telecommunication 🟨 | Jérôme Louveaux | [FR] | [q2] [30h+15h] [5 Credits] | | | x |
| ⭘ LINFO1140 | Electronic basics of computing | Jean-Didier Legat | [FR] | [q2] [30h+30h] [5 Credits] | x | | |

#### ⭘ Human Sciences, Economy, and Managment Courses (28 credits)

| | | | | | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| ⭘ LEPL1805 | People management | Bauduin Auquier<br>Philippe Henrotaux<br>Renaud Ronsse | [FR] | [q1] [22.5h+15h] [3 Credits] | | | x |
| ⭘ LECGE1222 | Microeconomics 🟨 | Johannes Johnen<br>Arastou Khatibi<br>François Maniquet | [FR] | [q1 or q2] [45h+15h] [5 Credits] | | x | |
| ⭘ LCOPS1115 | Economic Policy | Tanguy Isaac<br>Arastou Khatibi | [FR] | [q1] [45h+15h] [5 Credits] | x | | |
| ⭘ LESPO1113 | Sociology and Anthropology of the Contemporary Worlds | Joseph Amougou<br>Julien Charles<br>Jean De Munck<br>Hugues Draelants | [FR] | [q1 or q2] [40h] [5 Credits] | x | | |
| ⭘ LESPO1122 | Foundations of Law | Pierre Bazier<br>Nicolas Bonbled<br>Arnaud Hoc<br>Thibaut Slingeneyer<br>de Goeswin | [FR] | [q1 or q2] [40h] [5 Credits] | x | | |
| ⭘ LCOPS1124 | Philosophy | Nathalie Frogneux<br>Charlotte Luyckx<br>(compensates<br>Sylvain Camilleri) | [FR] | [q2] [30h] [5 Credits] | x | | |

#### ⭘ Cours de langues

##### ⭘ English Courses (7 credits)
*A placement test is organized at the beginning of the annual unit. Depending on the obtained mark, the students follow an adapted course based on their competence level. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language couse ( out of the 180 credits); this additionnal course will only affect their average mark if credited (mark greater or equal to 10/20)*

| | | | | | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| ⭘ LANGL1181 | English for Computer Scientists I | Jean-Luc<br>Delghust (coord.)<br>Lucille Meyers (coord.) | [EN] | [q1] [12h] [2 Credits] | x | | |

| | | | | | Year |
| --- | --- | --- | --- | --- | 1 | 2 | 3 |

| | | | | | 1 | 2 | 3 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ⊙ LANGL1282 | Anglais pour informaticiens II | Stéphanie Brabant<br>Jérémie Dupal<br>Charlotte Peters (coord.)<br>Marc Piwnik (coord.) | EN [q1] [30h] [3 Credits] | | | x | |
| ⊙ LANGL1383 | English for Computer Scientists III | Ahmed Adrioueche (coord.)<br>Charlotte Peters (coord.)<br>Françoise Stas | EN [q1] [30h] [2 Credits] | | | | x |

**⊙ Dutch courses**

| | | | | | 1 | 2 | 3 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ⊗ LNEER1300 | General and academic Dutch - intermediate level | Hilde Bufkens (coord.) | NL [q1 or q2] [30h] [2 Credits] | | x | | |
| ⊗ LNEER1500 | Interfaculty teaching unit - General and academic Dutch - upper-intermediate level | Hilde Bufkens (coord.)<br>Valérie Dachy | NL [q1] [30h] [3 Credits] | | x | | |

**⊙ German courses**

| | | | | | 1 | 2 | 3 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ⊗ LALLE1100 | German - Elementary level | Caroline Klein<br>Ann Rinder (coord.) | DE [q1+q2] [90h] [2 Credits] | | x | | |
| ⊗ LALLE1300 | General German – independent user – threshold | Virginie Godin (coord.)<br>Joy Picrit (compensates Virginie Godin) | DE [q1+q2] [90h] [3 Credits] | | x | | |
| ⊗ LALLE1500 | General German – independent user – vantage | Virginie Godin (coord.)<br>Joy Picrit (compensates Virginie Godin) | DE [q1+q2] [90h] [2 Credits] | | | | x |

**⊙ Spanish Courses**

| | | | | | 1 | 2 | 3 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ⊗ LESPA1100 | Spanish (beginner's level) 0-A2 | | ES [q1+q2] [90h] [2 Credits] △ | | x | | |
| ⊗ LESPA1300 | spanish middle level | | ES [q1+q2] [90h] [3 Credits] △ | | | x | |
| ⊗ LESPA1500 | Spanish Advanced level (B1.2 , B2.1) | Alicia Maria Tirado Fernandez (compensates Carmen Vallejo Villamor) | ES [q1] [45h] [2 Credits] | | | | x |
| ⊗ LESPA1101 | Spanish beginner's level 1st part (0-A1) | Begona Garcia Migura<br>Juan Landa Diestro<br>Alicia Maria Tirado Fernandez<br>Carmen Vallejo Villamor (coord.) | ES [q1 or q2] [45h] [2 Credits] | | | | x |

**⊙ Religion courses for students in exact sciences (2 credits)**
*The students select one course between:*

| | | | | | 1 | 2 | 3 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ⊗ LTECO2100 | Sociétés, cultures, religions : Biblical readings | Hans Ausloos | FR [q1] [15h] [2 Credits] | | | x | |
| ⊗ LTECO2300 | Societies, cultures, religions : Ethical questions | Marcela Lobo Bustamante | FR [q1] [15h] [2 Credits] | | | x | |
| ⊗ LTHEO2840 | Science and Christian faith | Benoît Bourgine<br>Dominique Lambert | FR [q1] [15h] [2 Credits] | | | x | |
| ⊗ LTECO2200 | Societies-cultures-religions : Human Questions | Sébastien Dehorter (compensates Régis Burnet)<br>Dominique Martens | FR [q1 or q2] [15h] [2 Credits] | | | x | |

## ⊙ Computer science training (71 credits)

*En bloc annuel 3, l'étudiant peut choisir soit LEPL1509 soit LSST1001 dans son programme de 180 crédits en bachelier. Le cours LSST1001 reste ouvert sur candidature et après sélection uniquement.*

| | | | | | 1 | 2 | 3 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ⊙ LINFO1115 | Reasoning about a highly connected world: graph theory, game theory and networks 📙 | Peter Van Roy | EN [q2] [30h+30h] [5 Credits] | | | | x |
| ⊙ LINFO1101 | Introduction to programming | Kim Mens<br>Siegfried Nijssen<br>Charles Pecheur | FR [q1] [30h+30h] [5 Credits] | | x | | |
| ⊙ LINFO1103 | Introduction to algorithms | Pierre Dupont | FR [q2] [30h+30h] [5 Credits] | | x | | |
| ⊙ LINFO1104 | Programming language concepts 📙 | Peter Van Roy | FR [q2] [30h+30h] [5 Credits] | | | x | |
| ⊙ LINFO1121 | Algorithms and data structures 📙 | Pierre Schaus | FR [q1] [30h+30h] [5 Credits] | | | | x |
| ⊙ LINFO1252 | Informatic Systems 📙 | Etienne Riviere | FR [q1] [30h+30h] [5 Credits] | | | | x |
| ⊙ LINFO1123 | Calculability, Logic and Complexity 📙 | Yves Deville | FR [q2] [30h+30h] [5 Credits] | | | x | |

| | | | | | Year |
|---|---|---|---|---|---|
| | | | | | 1 | 2 | 3 |
| O LINFO1341 | Computer networks 📔 | Olivier Bonaventure | FR | [q2] [30h+30h] [5 Credits] | | | x |
| O LEPL1402 | Informatics 2 📔 | Sébastien Jodogne<br>Ramin Sadre<br>Pierre Schaus | FR | [q1] [30h+30h] [5 Credits] | | x | |
| ⚒ LEPL1509 | Project 4 (in informatics) 📔 | Marc Lainez<br>(compensates<br>Yves Deville) | FR | [q2] [30h+22.5h] [5 Credits] | | | x |
| O LEPL1503 | Project 3 📔 | Olivier Bonaventure<br>(coord.)<br>Axel Legay | FR | [q2] [30h+30h] [5 Credits] | | x | |
| O LINFO1001 | IT projects 1 | Etienne Riviere | FR | [q1] [30h+30h] [6 Credits] | x | | |
| O LINFO1002 | IT projects 2 | Renaud Detry | FR | [q2] [30h+30h] [5 Credits] | x | | |
| ⚒ LSST1001 | IngénieuxSud | Stéphanie Merle<br>Jean-Pierre<br>Raskin (coord.) | FR | [q1+q2] [15h+45h] [5 Credits] | | | x |
| O LINFO1361 | Artificial intelligence | Yves Deville | FR | [q2] [30h+30h] [5 Credits] | | | x |

## o *Minor or additional module (30 credits)*

*The student completes his formation with the additional module in computer sciences or a minor.*

# List of available minors

Besides the core study, students will choose:

• the Additionnal module in Computer Science

• or one of the minors in the list below.

> Minor in Law (access)   *[ en-prog-2021-minadroi ]*
> Minor in Urban Architecture   *[ en-prog-2021-minarch ]*
> Minor in Information and Communication   *[ en-prog-2021-mincomu ]*
> Minor in Culture and Creation   *[ en-prog-2021-mincucrea ]*
> Minor in Scientific Culture   *[ en-prog-2021-mincults ]*
> Minor in Development and Environment   *[ en-prog-2021-mindenv ]*
> Minor in Sustainable Development (*)   *[ en-prog-2021-mindd ]*
> Minor in Economics   *[ en-prog-2021-minecon ]*
> Minor in European Studies   *[ en-prog-2021-mineuro ]*
> Minor in Gender Studies   *[ en-prog-2021-mingenre ]*
> Minor in Geography   *[ en-prog-2021-mingeog ]*
> Minor in Management (ESPO students)   *[ en-prog-2021-minagest ]*
> Minor in Human and Social Sciences   *[ en-prog-2021-minhuso ]*
> Minor in Philosophy   *[ en-prog-2021-minfilo ]*
> Minor in Linguistics   *[ en-prog-2021-minling ]*
> Minor in Literary Studies   *[ en-prog-2021-minlitt ]*
> Minor in entrepreneurship (*)   *[ en-prog-2021-minmpme ]*
> Minor in Musicology   *[ en-prog-2021-minmusi ]*
> Minor in Law (openness)   *[ en-prog-2021-minodroi ]*
> Additional module in computer science   *[ en-prog-2021-appsinf ]*
> Minor in Statistics, Actuarial Sciences and Data Sciences   *[ en-prog-2021-minstat ]*

  *(*) This programme is the subject of access criteria*

# 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 puposes 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:

- transform a prerequisite into a corequisite within the same year (to enable the student to continue his or her studies with a sufficient annual course load)
- require the student to combine registration in two separate CUs which it considers necessary from a pedagogical point of view.

For more information, please consult the Academic Regulations and Procedures (https://uclouvain.be/fr/decouvrir/rgee.html).

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# Prerequisities list

**LBIR1212**   "Probabilités et statistiques (I)"  has prerequisite(s) LINFO1111 ET LINFO1112

- LINFO1111 - Analysis
- LINFO1112 - Algebra

**LECGE1222**   "Microéconomie"  has prerequisite(s) LCOPS1115

- LCOPS1115 - Economic Policy

**LELEC1930**   "Introduction aux télécommunications"  has prerequisite(s) LINFO1140

- LINFO1140 - Electronic basics of computing

**LEPL1109**   "Statistiques et science des données"  has prerequisite(s) LBIR1212

- LBIR1212 - Probabilities and statistics (I)

**LEPL1402**   "Informatique 2"  has prerequisite(s) LINFO1101

- LINFO1101 - Introduction to programming

**LEPL1503**   "Projet 3"  has prerequisite(s) LINFO1101

- LINFO1101 - Introduction to programming

**LEPL1509**   "Projet 4 (en informatique)"  has prerequisite(s) LEPL1402

- LEPL1402 - Informatics 2

**LINFO1104**   "Concepts des langages de programmation"  has prerequisite(s) LINFO1101

- LINFO1101 - Introduction to programming

**LINFO1113**   "Algorithmique numérique"  has prerequisite(s) LINFO1101 ET LINFO1111 ET LINFO1112

- LINFO1101 - Introduction to programming
- LINFO1111 - Analysis
- LINFO1112 - Algebra

**LINFO1114**   "Mathématiques discrètes"  has prerequisite(s) LINFO1112

- LINFO1112 - Algebra

**LINFO1115**   "Reasoning about a highly connected world: graph theory, game theory and networks"  has prerequisite(s) LINFO1114

- LINFO1114 - Discrete mathematics

**LINFO1121**   "Algorithmique et structures de données"  has prerequisite(s) LEPL1402

- LEPL1402 - Informatics 2

**LINFO1123**   "Calculabilité, logique et complexité"  has prerequisite(s) LEPL1402 ET LINFO1114

- LEPL1402 - Informatics 2
- LINFO1114 - Discrete mathematics

**LINFO1252**   "Systèmes informatiques"  has prerequisite(s) LEPL1402 ET LEPL1503

- LEPL1402 - Informatics 2
- LEPL1503 - Project 3

**LINFO1341**   "Réseaux informatiques"  has prerequisite(s) LEPL1402

- LEPL1402 - Informatics 2

# 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.

# Detailed programme per annual block

## SINF1BA - 1ST ANNUAL UNIT

○ 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
[FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

### ○ *Core study*

#### ○ General and training

##### ○ Mathematics

| | | | |
|---|---|---|---|
| ○ LINFO1111 | Analysis | François Glineur<br>Roland Keunings | [FR] [q1] [45h +37.5h] [7 Credits] |
| ○ LINFO1112 | Algebra | Christophe Craeye<br>Thomas Peters<br>(compensates Enrico Vitale) | [FR] [q2] [30h+30h] [5 Credits] |

##### ○ Scientific and technical Courses

| | | | |
|---|---|---|---|
| ○ LINFO1140 | Electronic basics of computing | Jean-Didier Legat | [FR] [q2] [30h+30h] [5 Credits] |

##### ○ Human Sciences, Economy, and Managment Courses

| | | | |
|---|---|---|---|
| ○ LCOPS1115 | Economic Policy | Tanguy Isaac<br>Arastou Khatibi | [FR] [q1] [45h+15h] [5 Credits] |
| ○ LESPO1113 | Sociology and Anthropology of the Contemporary Worlds | Joseph Amougou<br>Julien Charles<br>Jean De Munck<br>Hugues Draelants | [FR] [q1 or q2] [40h] [5 Credits] |
| ○ LESPO1122 | Foundations of Law | Pierre Bazier<br>Nicolas Bonbled<br>Arnaud Hoc<br>Thibaut Slingeneyer de Goeswin | [FR] [q1 or q2] [40h] [5 Credits] |
| ○ LCOPS1124 | Philosophy | Nathalie Frogneux<br>Charlotte Luyckx<br>(compensates Sylvain Camilleri) | [FR] [q2] [30h] [5 Credits] |

#### ○ Cours de langues

##### ○ English Courses
*A placement test is organized at the beginning of the annual unit. Depending on the obtained mark, the students follow an adapted course based on their competence level. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language couse ( out of the 180 credits); this additionnal course will only affect their average mark if credited (mark greater or equal to 10/20)*

| | | | |
|---|---|---|---|
| O LANGL1181 | English for Computer Scientists I | Jean-Luc Delghust (coord.) Lucille Meyers (coord.) | EN [q1] [12h] [2 Credits] |

**O Dutch courses**

| | | | |
|---|---|---|---|
| ⚡ LNEER1300 | General and academic Dutch - intermediate level | Hilde Bufkens (coord.) | NL [q1 or q2] [30h] [2 Credits] |

**O German courses**

| | | | |
|---|---|---|---|
| ⚡ LALLE1100 | German - Elementary level | Caroline Klein Ann Rinder (coord.) | DE [q1+q2] [90h] [2 Credits] |

**O Spanish Courses**

| | | | |
|---|---|---|---|
| ⚡ LESPA1100 | Spanish (beginner's level) 0-A2 | | ES [q1+q2] [90h] [2 Credits] △ |

## o Computer science training

*En bloc annuel 3, l'étudiant peut choisir soit LEPL1509 soit LSST1001 dans son programme de 180 crédits en bachelier. Le cours LSST1001 reste ouvert sur candidature et après sélection uniquement.*

| | | | |
|---|---|---|---|
| O LINFO1101 | Introduction to programming | Kim Mens Siegfried Nijssen Charles Pecheur | FR [q1] [30h+30h] [5 Credits] |
| O LINFO1103 | Introduction to algorithms | Pierre Dupont | FR [q2] [30h+30h] [5 Credits] |
| O LINFO1001 | IT projects 1 | Etienne Riviere | FR [q1] [30h+30h] [6 Credits] |
| O LINFO1002 | IT projects 2 | Renaud Detry | FR [q2] [30h+30h] [5 Credits] |

## SINF1BA - 2ND ANNUAL UNIT

○ 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
[FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

### ○ *Core study*

#### ○ General and training

##### ○ Mathematics

| | | | |
|---|---|---|---|
| ○ LBIR1212 | Probabilities and statistics (I) 🟨 | Patrick Bogaert | FR [q1] [30h+15h] [4 Credits] |
| ○ LINFO1113 | Numerical algorithmic 🟨 | Loïc Quertenmont | FR [q1] [30h+30h] [6 Credits] |
| ○ LINFO1114 | Discrete mathematics 🟨 | Marco Saerens | FR [q2] [30h+15h] [5 Credits] |

##### ○ Human Sciences, Economy, and Managment Courses

| | | | |
|---|---|---|---|
| ○ LECGE1222 | Microeconomics 🟨 | Johannes Johnen Arastou Khatibi François Maniquet | FR [q1 or q2] [45h +15h] [5 Credits] |

##### ○ Cours de langues

##### ○ English Courses

*A placement test is organized at the beginning of the annual unit. Depending on the obtained mark, the students follow an adapted course based on their competence level. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language couse ( out of the 180 credits); this additionnal course will only affect their average mark if credited (mark greater or equal to 10/20)*

| | | | |
|---|---|---|---|
| ○ LANGL1282 | Anglais pour informaticiens II | Stéphanie Brabant Jérémie Dupal Charlotte Peters (coord.) Marc Piwnik (coord.) | ES [q1] [30h] [3 Credits] |

##### ○ Dutch courses

| | | | |
|---|---|---|---|
| ⊗ LNEER1500 | Interfaculty teaching unit - General and academic Dutch - upper-intermediate level | Hilde Bufkens (coord.) Valérie Dachy | NL [q1] [30h] [3 Credits] |

##### ○ German courses

| | | | |
|---|---|---|---|
| ⊗ LALLE1300 | General German – independent user – threshold | Virginie Godin (coord.) Joy Picrit (compensates Virginie Godin) | DE [q1+q2] [90h] [3 Credits] |

##### ○ Spanish Courses

| | | | |
|---|---|---|---|
| ⊗ LESPA1300 | spanish middle level | | ES [q1+q2] [90h] [3 Credits] △ |

##### ○ Religion courses for students in exact sciences

*The students select one course between:*

| | | | |
|---|---|---|---|
| ⊗ LTECO2100 | Sociétés, cultures, religions : Biblical readings | Hans Ausloos | FR [q1] [15h] [2 Credits] |
| ⊗ LTECO2300 | Societies, cultures, religions : Ethical questions | Marcela Lobo Bustamante | FR [q1] [15h] [2 Credits] |

| �LTHEO2840 | Science and Christian faith | Benoît Bourgine Dominique Lambert | FR [q1] [15h] [2 Credits] |
|---|---|---|---|
| ✖LTECO2200 | Societies-cultures-religions : Human Questions | Sébastien Dehorter (compensates Régis Burnet) Dominique Martens | FR [q1 or q2] [15h] [2 Credits] |

## ⊙ Computer science training

*En bloc annuel 3, l'étudiant peut choisir soit LEPL1509 soit LSST1001 dans son programme de 180 crédits en bachelier. Le cours LSST1001 reste ouvert sur candidature et après sélection uniquement.*

| ○ LINFO1104 | Programming language concepts 📙 | Peter Van Roy | FR [q2] [30h+30h] [5 Credits] |
|---|---|---|---|
| ○ LINFO1123 | Calculability, Logic and Complexity 📙 | Yves Deville | FR [q2] [30h+30h] [5 Credits] |
| ○ LEPL1402 | Informatics 2 📙 | Sébastien Jodogne Ramin Sadre Pierre Schaus | FR [q1] [30h+30h] [5 Credits] |
| ○ LEPL1503 | Project 3 📙 | Olivier Bonaventure (coord.) Axel Legay | FR [q2] [30h+30h] [5 Credits] |

## ⊙ *Minor or additional module*

*The student completes his formation with the additional module in computer sciences or a minor.*

## SINF1BA - 3RD ANNUAL UNIT

○ 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
[FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

### ○ *Core study*

#### ○ General and training

##### ○ Mathematics

| | | | |
|---|---|---|---|
| ○ LEPL1109 | Statistics and data sciences 🟨 | Donatien Hainaut<br>Laurent Jacques | [FR] [q1]<br>[30h+30h]<br>[5 Credits] |

##### ○ Scientific and technical Courses

| | | | |
|---|---|---|---|
| ○ LELEC1930 | Intoduction to telecommunication 🟨 | Jérôme Louveaux | [FR] [q2]<br>[30h+15h]<br>[5 Credits] |

##### ○ Human Sciences, Economy, and Managment Courses

| | | | |
|---|---|---|---|
| ○ LEPL1805 | People management | Bauduin Auquier<br>Philippe Henrotaux<br>Renaud Ronsse | [FR] [q1]<br>[22.5h<br>+15h] [3<br>Credits] |

##### ○ Cours de langues

###### ○ English Courses

*A placement test is organized at the beginning of the annual unit. Depending on the obtained mark, the students follow an adapted course based on their competence level. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language couse ( out of the 180 credits); this additionnal course will only affect their average mark if credited (mark greater or equal to 10/20)*

| | | | |
|---|---|---|---|
| ○ LANGL1383 | English for Computer Scientists III | Ahmed Adrioueche<br>(coord.)<br>Charlotte Peters (coord.)<br>Françoise Stas | [EN] [q1]<br>[30h] [2<br>Credits] |

###### ○ German courses

| | | | |
|---|---|---|---|
| ⊗ LALLE1500 | General German – independent user – vantage | Virginie Godin (coord.)<br>Joy Picrit (compensates<br>Virginie Godin) | [DE]<br>[q1+q2]<br>[90h] [2<br>Credits] |

###### ○ Spanish Courses

| | | | |
|---|---|---|---|
| ⊗ LESPA1500 | Spanish Advanced level (B1.2 , B2.1) | Alicia Maria<br>Tirado Fernandez<br>(compensates Carmen<br>Vallejo Villamor) | [ES] [q1]<br>[45h] [2<br>Credits] |
| ⊗ LESPA1101 | Spanish beginner's level 1st part (0-A1) | Begona Garcia Migura<br>Juan Landa Diestro<br>Alicia Maria<br>Tirado Fernandez<br>Carmen Vallejo<br>Villamor (coord.) | [ES] [q1 or<br>q2] [45h]<br>[2 Credits] |

#### ○ Computer science training

*En bloc annuel 3, l'étudiant peut choisir soit LEPL1509 soit LSST1001 dans son programme de 180 crédits en bachelier. Le cours LSST1001 reste ouvert sur candidature et après sélection uniquement.*

| | | | |
|---|---|---|---|
| ○ LINFO1115 | Reasoning about a highly connected world: graph theory, game theory<br>and networks 🟨 | Peter Van Roy | [EN] [q2]<br>[30h+30h]<br>[5 Credits] |
| ○ LINFO1121 | Algorithms and data structures 🟨 | Pierre Schaus | [EN] [q1]<br>[30h+30h]<br>[5 Credits] |

| | | | | |
|---|---|---|---|---|
| **O** LINFO1252 | Informatic Systems 📙 | | Etienne Riviere | FR [q1] [30h+30h] [5 Credits] |
| **O** LINFO1341 | Computer networks 📙 | | Olivier Bonaventure | FR [q2] [30h+30h] [5 Credits] |
| **�** LEPL1509 | Project 4 (in informatics) 📙 | | Marc Lainez (compensates Yves Deville) | FR [q2] [30h +22.5h] [5 Credits] |
| **✻** LSST1001 | IngénieuxSud | | Stéphanie Merle Jean-Pierre Raskin (coord.) | FR [q1+q2] [15h+45h] [5 Credits] |
| **O** LINFO1361 | Artificial intelligence | | Yves Deville | FR [q2] [30h+30h] [5 Credits] |

## o *Minor or additional module*

*The student completes his formation with the additional module in computer sciences or a minor.*

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### SINF1BA -  Information

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## Access Requirements

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*Decree of 7 November 2013 defining the landscape of higher education and the academic organization of studies.*

*The admission requirements must be met prior to enrolment in the University.*

**In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail.**

</div>

SUMMARY

- General access requirements
- Specific access requirements
- Access based on validation of professional experience
- Special requirements to access some programmes

## General access requirements

Except as otherwise provided by other specific legal provisions, admission to undergraduate courses leading to the award of a Bachelor's degree will be granted to students with one of the following qualifications :

1. A Certificate of Upper Secondary Education issued during or after the 1993-1994 academic year by an establishment offering full-time secondary education or an adult education centre in the French Community of Belgium and, as the case may be, approved if it was issued by an educational institution before 1 January 2008 or affixed with the seal of the French Community if it was issued after this date, or an equivalent certificate awarded by the Examination Board of the French Community during or after 1994;

2. A Certificate of Upper Secondary Education issued no later than the end of the 1992-1993 academic year, along with official documentation attesting to the student's ability to pursue higher education for students applying for a full-length undergraduate degree programme;

3. A diploma awarded by a higher education institution within the French Community that confers an academic degree issued under the above-mentioned Decree, or a diploma awarded by a university or institution dispensing full-time higher education in accordance with earlier legislation;

4. A higher education certificate or diploma awarded by an adult education centre;

5. A pass certificate for one of the entrance examinations (https://uclouvain.be/fr/etudier/inscriptions/examens-admission.html) organized by higher education institutions or by an examination board of the French Community; this document gives admission to studies in the sectors, fields or programmes indicated therein;

6. A diploma, certificate of studies or other qualification similar to those mentioned above, issued by the Flemish Community of Belgium, the German Community of Belgium or the Royal Military Academy;

7. A diploma, certificate of studies or other qualification obtained abroad and deemed equivalent to the first four mentioned above by virtue of a law, decree, European directive or international convention;

Note:

Requests for equivalence must be submitted to the Equivalence department (Service des équivalences) of the Ministry of Higher Education and Scientific Research of the French Community of Belgium in compliance with the official deadline.

The following two qualifications are automatically deemed equivalent to the Certificate of Upper Secondary Education (Certificat d'enseignement secondaire supérieur – CESS):

- European Baccalaureate issued by the Board of Governors of a European School,
- International Baccalaureate issued by the International Baccalaureate Office in Geneva.

8. Official documentation attesting to a student's ability to pursue higher education (diplôme d'aptitude à accéder à l'enseignement supérieur - DAES), issued by the Examination Board of the French Community.

## Specific access requirements

- To be eligible to apply to a bachelor's programme, holder of a non-belgian degree who do not have Belgian student status must also:

  - have earned a secondary school degree within the last three years;
  - not already hold a bachelor's degree; and,

- Candidates, whatever their nationality, with a secondary school diploma from a country outside the European Union, must have obtained an average of 13/20 minimum or, failing that, have obtained this average, have passed one year of study in Belgium (for example special Maths / sciences).

- For any secondary school diploma **from a European Union country**, the admission request must contain the equivalence of your diploma or, at the very least, proof of the filing of the equivalence request with the Wallonia-Brussels Federation (French Community of Belgium). For any information relating to obtaining an equivalence, please refer to the following site.

• Not to have obtained a secondary education diploma for more than 3 years maximum. Example: for an admission application for the academic year 2021-2022, you must have obtained your diploma during the academic years 2018-2019, 2019-2020 or 2020-2021. In the French Community of Belgium, the academic year runs from September 14 to September 13.l_information/2021/common-bachelor/

## Access based on validation of professional experience

Admission to undergraduate studies on the basis of accreditation of knowledge and skills obtained through professional or personal experience (Accreditation of Prior Experience)

Subject to the general requirements laid down by the authorities of the higher education institution, with the aim of admission to the undergraduate programme, the examination boards accredit the knowledge and skills that students have obtained through their professional or personal experience.

This experience must correspond to at least five years of documented activity, with years spent in higher education being partially taken into account: 60 credits are deemed equivalent to one year of experience, with a maximum of two years being counted. At the end of an assessment procedure organized by the authorities of the higher education institution, the Examination Board will decide whether a student has sufficient skills and knowledge to successfully pursue undergraduate studies.

After this assessment, the Examination Board will determine the additional courses and possible exemptions constituting the supplementary requirements for the student's admission.

## Special requirements to access some programmes

• Admission to **undergraduate studies in engineering: civil engineering and architect**

Pass certificate for the special entrance examination for undergraduate studies in engineering: civil engineering and architect (https://uclouvain.be/fr/facultes/epl/examenadmission.html).

Admission to these courses is always subject to students passing the special entrance examination. Contact the faculty office for the programme content and the examination arrangements.

• Admission to **undergraduate studies in veterinary medicine**

Admission to undergraduate studies in veterinary medicine is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents) (https://uclouvain.be/en/study/inscriptions/etudes-contingentees.html).

• Admission to **undergraduate studies in physiotherapy and rehabilitation**

Admission to undergraduate studies in physiotherapy and rehabilitation is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents). (https://uclouvain.be/en/study/inscriptions/etudes-contingentees.html)

• Admission to **undergraduate studies in psychology and education: speech and language therapy**

Admission to undergraduate studies in psychology and education: speech and language therapy is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents) (https://uclouvain.be/en/study/inscriptions/etudes-contingentees.html).

• Admission to **undergraduate studies in medicine and dental science**

Admission to undergraduate studies in medecine and dental science is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses (non-residents). (https://uclouvain.be/en/study/inscriptions/etudes-contingentees.html)

Note: students wishing to enrol for a **Bachelor's degree in Medicine** or a **Bachelor's degree in dental science** must first sit an aptitude test (fr) (https://uclouvain.be/en/study/inscriptions/etudes-contingentees.html).

## Teaching method

A significant part of the courses in Computer Science will focus on learning techniques through problem solving.  Amongst others, two integrated computer science projects will enable the students to integrate the various course topics and expose them to the problem of realizing small-scale projects (via laboratory sessions in the first year), or medium-scale projects (via a project during the second quadrimester of the third year).

## Evaluation

***The evaluation methods comply with the <u>regulations concerning studies and exams</u> (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 course content and activities are evaluated in accordance with the prevailing rules of the University (see the exam regulations).

Most of the courses include at least one evaluation during the course of the quadrimester (ongoing evaluation), in addition to a final examination during the exam sessions (in January, June or September). Evaluations are either in written or in oral form. The specific evaluation details and procedures for each course are presented at the start of each study period.

## Mobility and/or Internationalisation outlook

The computer-science related components of the programme adhere to the standard curricula proposed by international standard organisations such as ACM and IEEE. This fosters student mobility to or from the numerous universities offering similar programmes that conform to these norms.

The programme respects the harmonisation rules established by universities of the CFB; the degree obtained upon completion of the programme therefore entitles direct access, without the need for any complementary prerequisites, to the master's programme in Computer Science at any one of those universities.

In the context of the master studies in Computer Science at UCL, the student also has the opportunity to participate in the Erasmus/ Socrates exchange programmes which UCL has subscribed to, together with universities from numerous European and extra-European countries, as well as with the Catholic University of Leuven (Katholieke Universiteit Leuven) in Flanders.

## Possible trainings at the end of the programme

Access to the master's in Computer Science

The bachelor's programme in Computer Science grants direct access to the master's programme in Computer Science.

Access to the master in Management

The master's programme in Management is accessible to students having followed a minor in Management, under certain conditions which are described on the web page dedicated to this minor https://uclouvain.be/prog-lmingest3.html

## Contacts

### Curriculum Management

Entity

| | |
|---|---|
| Structure entity | SST/EPL/INFO |
| Denomination | (INFO) |
| Faculty | Louvain School of Engineering (EPL) |
| Sector | Sciences and Technology (SST) |
| Acronym | INFO |
| Postal address | Place Sainte Barbe 2 - bte L5.02.01 |
| | 1348 Louvain-la-Neuve |
| | Tel: +32 (0) 10 47 31 50  -  Fax: +32 (0) 10 45 03 45 |

Academic supervisor: Pierre Schaus (https://uclouvain.be/repertoires/pierre.schaus)

Jury

- Président du Jury: Jean-Didier Legat (https://uclouvain.be/repertoires/jean-didier.legat)
- Secrétaire du Jury: Ramin Sadre (https://uclouvain.be/repertoires/ramin.sadre)

Useful Contact(s)

- Conseillère aux études: Sofie De Pauw (https://uclouvain.be/repertoires/sofie.depauw)