

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In EnglishDissertation/Graduation Project : **YES** - Internship : **optional**Activities in English: **YES** - Activities in other languages : **YES**Activities on other sites : **NO**Main study domain : **Sciences de l'ingénieur et technologie**Organized by: **Louvain School of Engineering (EPL)**Programme acronym: **MAP2M** - Francophone Certification Framework: 7**Table of contents**

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MAP2M - Introduction

Introduction

Introduction

This Master's degree programme develops the necessary knowledge and expertise for mathematical engineering:

- the design, analysis and implementation of mathematical models for the engineering of the complex systems of the industrial sector and the elaboration of effective strategies to optimise their performance;
- the implementation of theoretical and methodological tools in all areas of engineering sciences as well as in other fields such as economics, finance, environmental and life sciences.

Your profile

You

- have solid knowledge of mathematics
- are seeking an engineering programme with a focus on applied mathematics
- want access to engineering jobs (in manufacturing and services companies) or to the areas of life sciences, environment or finance;
- want to take advantage of the most recent research advances in your area of specialisation.

Your future job

Mathematical engineers are present in all industrial sectors: industrial chemistry, pharmaceutical and food industries, electronics and telecommunications, energy, metallurgy, aeronautics, civil engineering, mass distribution, banking or consulting services, nanotechnologies and medical technology.

They play a role in research and development, oversee production or management and work in marketing and sales (of high tech products).

We find them in departments of finance, computer science, training and quality control, in the public sector, higher education and in the Minister of equipment and transport (www.fabi.be)

Your programme

This Master's degree programme offers you

- training in mathematical modelling in all areas of engineering sciences;
- flexibility when it comes to building your programme (major and elective courses compose more than half of the programme);
- the opportunity to complete part of the programme abroad or at KULeuven;
- via complementary modules, direct access to the second year Master's degree programme in general statistics, biostatistics or actuarial sciences.

MAP2M - Teaching profile

Learning outcomes

The Master in Mathematical Engineering is an interdisciplinary engineering master centred on the notion of mathematical model that has become instrumental in engineering sciences. Through a training in modelling, simulation and optimization (MSO), the students learn to design, analyse and implement mathematical models to be applied to complex systems of the industrial or corporate world, and to create efficient strategies to optimize their performance.

The mandatory courses provide the students with the necessary common skills in MSO. They span the domains of numerical analysis and scientific computing, dynamical systems, matrix computations, stochastic models, optimization models and methods.

Students are moreover offered several coherent lists of courses, called "options". Some of the options provide them with advanced skills in various branches of MSO: optimization and operations research, dynamical systems and control, and computational engineering. The other options pertain to data science, financial mathematics, cryptography & information security, biomedical engineering, business risks and opportunities, and launching of small and medium-sized companies.

Below is the competency framework common to all the engineering masters. The Master in Mathematical Engineering distinguishes itself by the interdisciplinary engineering scope of the competencies and by the fact that modelling-related competencies are strengthened by the strong MSO background acquired by the students.

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

1. demonstrating their mastery of a solid body of knowledge in basic engineering sciences allowing them to understand and solve problems related to their discipline

1.1 Identify and use concepts, laws, and appropriate reasoning to solve a given problem

1.2 Identify and use appropriate modelling and calculation tools to solve problems

1.3 Verify the plausibility and confirm the validity of results

2. organise and carry out a procedure in applied engineering to develop a product (and/or service) that meets a need or solves a particular problem:

2.1 Analyse the problem and formulate a corresponding specifications note

2.2 Model the problem and design one or more original technical solutions that correspond to the specifications note

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

2.4 Implement and test a solution through a mock up, a prototype or a numerical model

2.5 Formulate recommendations to improve the operational character of the solution being studied

3. organise and carry out a research project in order to understand a physical phenomenon or a new problem relevant to the discipline

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 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 (resources, budget, deadlines)

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.

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 that you are able to do your job with a professional conscience and in a socially responsible manner. Show that you can evaluate the socio-technical relevance of a solution before putting it into place.

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 for "lifelong learning" in the field

Programme structure

The Master's degree programme consists of:

- A core curriculum (27 credits)
- The professional focus (30 credits).
- Elective courses (in the options, modules, courses of interest, or other courses if suitably motivated) to reach a total of at least 120 credits, including at least 20 credits among options 1 (optimization), 2 (systems) and 3 (computational engineering).

The graduation (or end of studies) project is normally carried out at the end of the programme (second year). Depending on the students' programme, he/she may take the courses in the first or second year if the course prerequisites allow it. This may be particularly useful for those students who pursue a portion of their studies outside of UCL as part of an exchange programme.

If during the student's previous studies, he or she has already taken a course that is part of the programme (either required or elective) or they have participated in an academic activity that is approved by the programme commission, the student may count this activity toward their graduation requirements (but only if they respect programme rules). The student will also verify that he/she has obtained the minimum number of credits required for the approval of their diploma as well as for the approval of their major (in order to include their academic distinctions in the diploma supplement).

These types of programmes will be submitted for approval by the relevant Master's degree programme jury

MAP2M Programme

Detailed programme by subject

CORE COURSES [27.0]

- Mandatory
- ✘ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- ⊕ Open to incoming exchange students
- ⊖ Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

				Year	
				1	2
● LINMA2990	Graduation project/End of studies project <i>The graduation project can be written and presented in French or English, in consultation with the supervisor. It may be accessible to exchange students by prior agreement between the supervisors and/or the two universities.</i>		EN [q1+q2] [] [25 Credits] ⊕		x
● LEPL2020	Professional integration work <i>Les modules du cours LEPL2020 sont organisés sur les deux blocs annuels du master. Il est fortement recommandé à l'étudiant.e de les suivre dès le bloc annuel 1, mais il.elle ne pourra inscrire le cours que dans son programme de bloc annuel 2.</i>	Myriam Banaï Francesco Contino (coord.) Delphine Ducarme Jean-Pierre Raskin	EN [q1+q2] [30h+15h] [2 Credits] ⊕ > French-friendly	x	x

PROFESSIONAL FOCUS [30.0]

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

Content:

○ LINMA2171	Numerical Analysis : Approximation, Interpolation, Integration	Pierre-Antoine Absil	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	
○ LINMA2370	Modelling and analysis of dynamical systems	Jean-Charles Delvenne	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	
○ LINMA2380	Matrix computations	Jean-Charles Delvenne (compensates Raphaël Jungers)	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	
○ LINMA2470	Stochastic modelling	Philippe Chevalier Mehdi Madani (compensates Philippe Chevalier)	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	
○ LINMA2471	Optimization models and methods II	François Glineur Geovani Nunes Grapiglia	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	
○ LINMA2710	Scientific computing	Pierre-Antoine Absil Karl Meerbergen (compensates Anthony Papavasiliou)	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	

OPTIONS

Dans la rubrique "Options du master ingénieur civil en mathématiques appliquées", l'étudiant-e sélectionne au moins 20 crédits parmi les trois premières options.

Dans la rubrique "Options et cours au choix en connaissances socioéconomiques", l'étudiant-e valide une des deux options ou choisit obligatoirement au minimum 3 crédits parmi les cours au choix ou les cours de l'option en enjeu de l'entreprise.

Majors for the Master's degree in mathematical engineering

- > Major in Optimization and operations research engineering [en-prog-2022-map2m-lmap221o]
- > Major in Systems and control engineering [en-prog-2022-map2m-lmap222o]
- > Major in Computational engineering [en-prog-2022-map2m-lmap223o]
- > Major in Data science [en-prog-2022-map2m-lmap224o]
- > Major in Financial mathematics [en-prog-2022-map2m-lmap226o]
- > Major in Cryptography and information security [en-prog-2022-map2m-lmap234o]
- > Major in biomedical engineering [en-prog-2022-map2m-lmap230o]
- > Cours au choix disciplinaires [en-prog-2022-map2m-lmap237o]

Options et cours au choix en connaissances socio-économiques

- > Business risks and opportunities [en-prog-2022-map2m-lmap233o]
- > Major in small and medium sized business creation [en-prog-2022-map2m-lmap235o]
- > Cours au choix en connaissances socio-économiques [en-prog-2022-map2m-lmap200o]

Others elective courses

- > Others elective courses [en-prog-2022-map2m-lmap229o]

MAJORS FOR THE MASTER'S DEGREE IN MATHEMATICAL ENGINEERING

The student shall select at least 20 credits among the first three options

MAJOR IN OPTIMIZATION AND OPERATIONS RESEARCH ENGINEERING

This option provides the students with advanced skills in optimization models and methods (continuous or discrete, deterministic or stochastic) and introduces them to various domains of application, among which operations research (quantitative methods for decision making).

- Mandatory
- ✘ Optional
- △ Not offered in 2022-2023
- ⊙ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

From 20 to 25credit(s)

Year

1 2

o Content:

✘ LINMA2415	Quantitative Energy Economics	Gauthier de Maere d'Aertrycke (compensates Anthony Papavasiliou)	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
✘ LINMA2450	Combinatorial optimization	Julien Hendrickx Geovani Nunes Grapiglia	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
✘ LINMA2460	Optimization : Nonlinear programming	Geovani Nunes Grapiglia	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
✘ LINMA2491	Operational Research	Mehdi Madani (compensates Anthony Papavasiliou)	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
✘ LINMA2345	Game theory	Matthew Philippe (compensates Raphaël Jungers)	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X

MAJOR IN SYSTEMS AND CONTROL ENGINEERING

This option provides students with advanced skills in the modelling and analysis of dynamical systems and in the design of control laws, with applications in biological systems and ecological and epidemiological processes in particular.

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊙ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

From 20 to 30credit(s)

Year

1 2

o Content:

				1	2
⊗ LGBIO2060	Modelling of biological systems	Philippe Lefèvre	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2300	Analysis and control of distributed parameter systems		EN [q1] [30h+30h] [5 Credits] △ 🌐 > French-friendly	X	X
⊗ LINMA2361	Nonlinear dynamical systems	Pierre-Antoine Absil Estelle Massart	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2671	Advanced control and applications	Julien Hendrickx	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2875	System Identification	Gianluca Bianchin	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2510	Mathematical ecology	Eric Deleersnijder Emmanuel Hanert Thierry Van Effelterre	EN [q2] [30h+22.5h] [5 Credits] ⊙ 🌐 > French-friendly	X	X

MAJOR IN COMPUTATIONAL ENGINEERING

This option provides students with advanced skills in modelling techniques and numerical simulation methods to analyse and solve various engineering problems.

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊙ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

From 20 to 25credit(s)

Year

1 2

o Content:

⊗ LGCIV2041	Numerical analysis of civil engineering structures	Hadrien Rattez João Saraiva Esteves Pacheco De Almeida	EN [q2] [20h+15h] [4 Credits] 🌐 > French-friendly	X	X	
⊗ LINMA2111	Discrete mathematics II : Algorithms and complexity	Jean-Charles Delvenne Jean-Charles Delvenne (compensates Vincent Blondel)	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X	
⊗ LINMA2720	Mathematical modelling of physical systems		EN [q2] [30h+22.5h] [5 Credits] △ 🌐 > French-friendly	X	X	
⊗ LMECA2170	Numerical Geometry	Vincent Legat Jean-François Remacle	EN [q1] [30h+30h] [5 Credits] 🌐	X	X	
⊗ LMECA2300	Advanced Numerical Methods	Philippe Chatelain Christophe Craeye (coord.) Vincent Legat Jean-François Remacle	EN [q2] [30h+30h] [5 Credits] 🌐	X	X	

MAJOR IN DATA SCIENCE

This option proposes a selection of courses of statistics, data mining, algorithmics and data architectures that introduce the students to several facets of Data Science.

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

From 20 to 30credit(s)

Year
1 2

o Content:

o Compulsory courses in data science

○ LINMA2472	Algorithms in data science	Jean-Charles Delvenne (coord.) Gautier Krings (compensates Vincent Blondel)	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
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⊗ Elective courses in data science

⊗ LELEC2870	Machine learning : regression, deep networks and dimensionality reduction	John Lee Michel Verleysen	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2145	Cloud Computing	Etienne Riviere	EN [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2172	Databases	Siegfried Nijssen	EN [q2] [30h+30h] [6 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2262	Machine Learning :classification and evaluation	Thibault Helleputte (compensates Pierre Dupont)	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2364	Mining Patterns in Data	Siegfried Nijssen	EN [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2275	Data mining & decision making	Marco Saerens	EN [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LSTAT2020	Statistical softwares and basic statistical programming	Céline Bugli (compensates Bernadette Govaerts)	EN [q1] [15h+15h] [4 Credits] 🌐	X	X
⊗ LDATS2360	Seminar in data management: basic	Céline Bugli	EN [q1] [15h+10h] [5 Credits] 🌐	X	X
⊗ LDATA2010	Information visualisation	John Lee	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X

MAJOR IN FINANCIAL MATHEMATICS

The objective of this major is to introduce students to quantitative financial techniques and actuarial sciences by presenting deterministic and stochastic mathematical methods used in financial markets. The main subjects covered deal with the evaluation of financial assets and insurance products in continuous-time. Special attention is paid to numerical simulation methods. In addition, for students who will to enroll in the Master's degree programme in actuarial sciences, all the compulsory courses of the programme ACTU2M validated in this major will be valorized.

- Mandatory
- ✂ Optional
- △ Not offered in 2022-2023
- ⊙ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- ⊕ Open to incoming exchange students
- ⊗ Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

From 15 to 20credit(s)

Year

1 2

o Content:

					1	2
✂ LINMA2725	Financial mathematics	Pierre Devolder	FR [q1] [30h+22.5h] [5 Credits]		X	X
✂ LACTU2020	Fixed income mathematics	Pierre Devolder	FR [q1] [45h+15h] [7 Credits]		X	X
✂ LACTU2030	LIFE INSURANCE	Donatien Hainaut	FR [q1] [45h] [7 Credits]		X	X
✂ LACTU2170	STOCHASTIC FINANCE	Donatien Hainaut	FR [q2] [30h] [5 Credits]		X	X

MAJOR IN CRYPTOGRAPHY AND INFORMATION SECURITY

As with the Master's degree engineering programmes in electricity, computer sciences and applied mathematics, this major provides students with the knowledge of fundamental algorithms and mathematics in order to better understand information security as well as the design and implementation of solutions for problems related to electronic circuits and information systems.

- Mandatory
- ⌘ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:**⌘ Elective courses**

In order to validate this option INFO and MAP students have to take at least 20 credits and the ELEC, DATE and DATI students have to take at least 15 credits among:

⌘ LELEC2760	Secure electronic circuits and systems	François-Xavier Standaert	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LINFO2144	Secured systems engineering	Axel Legay	FR [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LINFO2347	Computer system security	Ramin Sadre	FR [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LINGI2348	Information theory and coding	Jérôme Louveaux Benoît Macq Olivier Pereira	FR [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LMAT2440	Number theory	Pierre-Emmanuel Caprace Olivier Pereira	FR [q1] [30h+15h] [5 Credits] 🌐 > English-friendly	X	X
⌘ LMAT2450	Cryptography	Olivier Pereira	FR [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LELEC2770	Privacy Enhancing technology	Olivier Pereira François-Xavier Standaert	FR [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X

MAJOR IN BIOMEDICAL ENGINEERING

The goal of this major is to train engineers who are capable of meeting the future technological challenges in the scientific and technical areas of biomedical engineering. This major provides students with basic knowledge of several areas of biomedical engineering such as bioinstrumentation, biomaterials, medical imaging, mathematical modelling, artificial organs and rehabilitation, and biomechanics. Through the collaboration between the Louvain School of Engineering and the School of Medicine, students benefit from an interdisciplinary programme where the art of engineering is applied to the complex and varied biomedical field.

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊙ Not offered in 2022-2023 but offered the following year
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- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- ⊕ Open to incoming exchange students
- ⊗ Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

From 15 to 30credit(s)

Year

1 2

o Content:

o Elective courses in biomedical engineering

Students enrolled in this major must select a minimum of 15 credits among the following elective courses except for those students enrolled in the Master's degree programme in computer science and engineering who are required to take 20 credits.

⊗ LGBIO2010	Bioinformatics	Vincent Branders (compensates Pierre Dupont)	FR [q1] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X
⊗ LGBIO2020	Bioinstrumentation	André Mouraux Michel Verleysen	FR [q1] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X
⊗ LGBIO2030	Biomaterials	Sophie Demoustier Christine Dupont	FR [q1] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X
⊗ LGBIO2040	Biomechanics	Greet Kerckhofs	FR [q2] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X
⊗ LGBIO2050	Medical Imaging	Greet Kerckhofs John Lee Benoît Macq Frank Peeters	FR [q1] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X
⊗ LGBIO2060	Modelling of biological systems	Philippe Lefèvre	FR [q1] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X
⊗ LGBIO2072	Mathematical models in neuroscience	Frédéric Crevecoeur	FR [q1] [30h+30h] [5 Credits] ⊕ > French-friendly	X	X

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

Year

1 2

Content:

⌘ Complement to the major in financial mathematics

In addition, students who would like to enrol subsequently in the Master in Actuarial Sciences will be able to add value to all the compulsory courses in the ACTU2M programme that they will have validated in the financial mathematics option.

⌘ LACTU2010	NON LIFE INSURANCE	Michel Denuit	FR [q1] [45h] [7 Credits] 🌐	X	X
⌘ LACTU2040	PENSION FUNDING	Pierre Devolder	FR [q2] [30h+15h] [5 Credits] 🌐	X	X
⌘ LACTU2210	Quantitative Risk Management	Christian Hafner	EN [q2] [30h] [5 Credits] 🌐 > French-friendly	X	X

⌘ Module in Biostatistics and Technometry

Students taking 30 credits in this module will be able to complete the Master in Statistics, Biostatistics orientation [120 credits] in one year. More information via the Secretariat of the School of Statistics, Biostatistics and Actuarial Sciences (LSBA): info-stat-actu@uclouvain.be

⌘ LBIRA2110B	Applied Econometrics	Xavier Draye Frédéric Gaspard Bernadette Govaerts	FR [q1] [27.5h+7.5h] [3 Credits] 🌐 > English-friendly	X	X
⌘ LSTAT2040	Statistical analysis	Benjamin Colling (compensates Anouar El Ghouch)	FR [q2] [30h+15h] [5 Credits] 🌐	X	X
⌘ LSTAT2130	Introduction to Bayesian statistics	Philippe Lambert	EN [q2] [22.5h+7.5h] [4 Credits] 🌐	X	X
⌘ LSTAT2220	Analysis of survival and duration data	Ingrid Van Keilegom	FR [q1] [15h+5h] [4 Credits] 🌐 > English-friendly	X	X
⌘ LSTAT2310	Statistical quality control.	Bernard Francq (compensates Bernadette Govaerts)	FR [q1] [15h+5h] [4 Credits] 🌐 > English-friendly	X	X
⌘ LSTAT2330	Statistics in clinical trials.	Catherine Legrand Annie Robert	FR [q2] [22.5h+7.5h] [5 Credits] 🌐	X	X
⌘ LDATS2360	Seminar in data management: basic	Céline Bugli	FR [q1] [15h+10h] [5 Credits] 🌐	X	X
⌘ LDATS2370	Data Management II : SAS ADVANCED PROGRAMMING	Christophe Kabacinski	FR [q2] [15h+10h] [5 Credits] 🌐	X	X

⌘ Module in General Statistics and Mathematics

Students taking 30 credits in this module will be able to complete the Master in Statistics [120 credits] in one year. More information via the Secretariat of the School of Statistics, Biostatistics and Actuarial Sciences (LSBA): info-stat-actu@uclouvain.be

⌘ LELEC2870	Machine learning : regression, deep networks and dimensionality reduction	John Lee Michel Verleysen	FR [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LINFO2262	Machine Learning :classification and evaluation	Thibault Helleputte (compensates Pierre Dupont)	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LINMA2472	Algorithms in data science	Jean-Charles Delvenne (coord.) Gautier Krings (compensates Vincent Blondel)	EN [q1] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LINFO2275	Data mining & decision making	Marco Saerens	FR [q2] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⌘ LSTAT2020	Statistical softwares and basic statistical programming	Céline Bugli (compensates Bernadette Govaerts)	FR [q1] [15h+15h] [4 Credits] 🌐	X	X
⌘ LSTAT2040	Statistical analysis	Benjamin Colling (compensates Anouar El Ghouch)	FR [q2] [30h+15h] [5 Credits] 🌐	X	X

				Year	
				1	2
⊗ LSTAT2110	Data Analysis	Johan Segers	FR [q1] [30h+7.5h] [5 Credits]	X	X
⊗ LSTAT2120	Linear models	Christian Hafner	EN [q1] [30h+7.5h] [5 Credits] > French-friendly	X	X
⊗ LSTAT2130	Introduction to Bayesian statistics	Philippe Lambert	EN [q2] [22.5h+7.5h] [4 Credits]	X	X
⊗ LSTAT2150	Nonparametric statistics: smoothings methods	Rainer von Sachs	EN [q1] [15h+5h] [4 Credits]	X	X
⊗ LSTAT2170	Times series	Rainer von Sachs	EN [q2] [30h+7.5h] [5 Credits]	X	X
⊗ LDATS2360	Seminar in data management: basic	Céline Bugli	FR [q1] [15h+10h] [5 Credits]	X	X

⊗ Courses of interest

⊗ LECON2021	Economic Fluctuations and Foundations of Macro Policy	Grégory de Walque (compensates David De la Croix)	FR [q2] [30h] [5 Credits]	X	X
⊗ LECON2031	Applied Econometrics : Time Series	Francesca Monti	EN [q1] [30h+12h] [5 Credits]	X	X
⊗ LECON2033	Applied econometrics: Microeconometrics	Muriel Dejemeppe Bertrand Verheyden (compensates Muriel Dejemeppe)	FR [q1] [30h+12h] [5 Credits]	X	X
⊗ LELEC1360	TELECOMMUNICATIONS	Charles Wiame (compensates Luc Vandendorpe)	FR [q2] [30h+30h] [5 Credits]	X	X
⊗ LELEC2880	Estimation and communication theory	Jérôme Louveaux (coord.)	EN [q2] [30h+30h] [5 Credits] > French-friendly	X	X
⊗ LELEC2885	Image processing and computer vision	Christophe De Vleeschouwer (coord.) Laurent Jacques	EN [q1] [30h+30h] [5 Credits] > French-friendly	X	X
⊗ LELEC2900	Signal processing	Laurent Jacques François Rottenberg (compensates Luc Vandendorpe)	EN [q2] [30h+30h] [5 Credits] > French-friendly	X	X
⊗ LINGI2348	Information theory and coding	Jérôme Louveaux Benoît Macq Olivier Pereira	EN [q2] [30h+15h] [5 Credits] > French-friendly	X	X
⊗ LMAT1371	Probability Theory	Johan Segers	FR [q2] [30h+22.5h] [5 Credits]	X	X
⊗ LMAT2130	Partial differential equations	Heiner Obermann	EN [q1] [30h+15h] [5 Credits]	X	X
⊗ LMAT2410	Partial differential equation : heat equation, brownian moves and numerical aspects		FR [q2] [30h+15h] [5 Credits] > English-friendly	X	X
⊗ LMAT2460	Finite mathematics and combinatorial structures	Thomas Peters	FR [q1] [30h] [5 Credits] > English-friendly	X	X
⊗ LMECA1100	Deformable solid mechanics.	Issam Doghri	FR [q1] [30h+30h] [5 Credits]	X	X
⊗ LMECA1321	Fluid mechanics and transfer phenomena.	Vincent Legat Grégoire Winckelmans	FR [q1] [30h+30h] [5 Credits]	X	X
⊗ LMECA2660	Numerical methods in fluid mechanics	Grégoire Winckelmans	EN [q2] [30h+30h] [5 Credits]	X	X
⊗ LMECA2771	Thermodynamics of irreversible phenomena.	Miltiadis Papalexandris	EN [q2] [30h+30h] [5 Credits]	X	X
⊗ LELME2732	Robot modelling and control	Renaud Ronsse	EN [q2] [30h+30h] [5 Credits] > French-friendly	X	X
⊗ LSTAT2100	Discrete data analysis.	Cécile Adam (compensates Anouar El Ghouch)	FR [q2] [30h+7.5h] [5 Credits]	X	X
⊗ LDATS2350	Data Mining	Robin Van Oirbeek	EN [q2] [15h+15h] [5 Credits]	X	X
⊗ LGCIV2056	Marine Hydrodynamics	Eric Deleersnijder	EN [q1] [30h+15h] [5 Credits] > French-friendly	X	X
⊗ LLSMS2034	Supply Chain Planning	Marc Foret Mathieu Van Vyve	EN [q2] [30h] [5 Credits]	X	X
⊗ LMAPR2018	Rheology	Evelyne Van Ruymbeke	EN [q2] [30h+30h] [5 Credits] > French-friendly	X	X
⊗ LGBIO2072	Mathematical models in neuroscience	Frédéric Crevecoeur	EN [q1] [30h+30h] [5 Credits] > French-friendly	X	X

OPTIONS ET COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES [3.0]

BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊙ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

Content:

Course Code	Course Title	Instructor	Language	Duration	Credits	Open to incoming exchange students	Year 1	Year 2
● LEPL2211	Business issues introduction	Benoît Gailly	EN [q2] [30h] [3 Credits] 🌐	> French-friendly			X	X
● LEPL2212	Financial performance indicators	André Nsabimana	EN [q2] [30h+5h] [4 Credits] 🌐	> French-friendly			X	X
● LEPL2214	Law, Regulation and Legal Context	Vincent Cassiers Werner Derycke	FR [q1] [30h+5h] [4 Credits] 🌐				X	X

One course between

From 3 to 5 credit(s)

⊗ LEPL2210	Ethics and ICT	Axel Gosseries Olivier Pereira	EN [q2] [30h] [3 Credits] 🌐	> French-friendly			X	X
⊗ LLSMS2280	Business Ethics and Compliance Management	Carlos Desmet	EN [q1] [30h] [5 Credits] 🌐				X	X

⊗ Cours en marketing

⊗ MGEST1108	Marketing	Nadia Sinigaglia	FR [q2] [45h+20h] [6 Credits] 🌐				X	X
⊗ MLSMM2136	Trends in Digital Marketing ■	Ingrid Poncin	FR [q2] [30h] [5 Credits] 🌐					X
⊗ MLSMM2134	e-Consumer Behavior ■	Karine Charry	FR [q2] [30h] [5 Credits] 🌐					X

⊗ Cours en Sourcing and Procurement

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

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

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

MAJOR IN SMALL AND MEDIUM SIZED BUSINESS CREATION

Commune à la plupart des masters de l'EPL, cette option a pour objectif de familiariser l'étudiant-e avec les spécificités de l'entrepreneuriat et de la création d'entreprise afin de développer chez lui les aptitudes, connaissances et outils nécessaires à la création d'entreprise.

Cette option rassemble des étudiants de différentes facultés en équipes interdisciplinaires afin de créer un projet entrepreneurial. La formation interdisciplinaire en création d'entreprise (CPME) est une option qui s'étend sur 2 ans et s'intègre dans plus de 30 Masters de 9 facultés/écoles de l'UCLouvain. Le choix de l'option CPME implique la réalisation d'un mémoire interfacultaire (en équipe) portant sur un projet de création d'entreprise. L'accès à cette option, ainsi qu'à chacun des cours, est limité aux étudiant-es sélectionnés sur dossier. Toutes les informations sur www.uclouvain.be/cpme.

L'étudiant.e qui choisit de valider cette option doit sélectionner au minimum 20 crédits et au maximum 25 crédits. Cette option n'est pas accessible en anglais et ne peut être prise simultanément avec l'option « Enjeux de l'entreprise ».

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- ⊕ Open to incoming exchange students
- ⊖ Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:

o Required courses for the major in small and medium sized businesses

○ LCPME2001	Théorie de l'entrepreneuriat	Frank Janssen	○ [q1] [30h+20h] [5 Credits] ⊕	X	
○ LCPME2002	Aspects juridiques, économiques et managériaux de la création d'entreprise	Yves De Cordt Marine Falize	○ [q1] [30h+15h] [5 Credits] ⊕	X	
○ LCPME2003	Plan d'affaires et étapes-clefs de la création d'entreprise <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>	Frank Janssen	○ [q2] [30h+15h] [5 Credits] ⊕		X
○ LCPME2004	Séminaire d'approfondissement en entrepreneuriat	Frank Janssen	○ [q2] [30h+15h] [5 Credits] ⊕	X	

⊗ Prerequisite CPME courses

Student who have not taken management courses during their previous studies must enroll in LCPME2021.

○ LCPME2021	Financer son projet	Yves De Rongé	○ [q2] [30h+15h] [5 Credits] ⊕	X	
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COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:

				1	2
⊗ LFSA2995	Company Internship	Dimitri Lederer Jean-Pierre Raskin	(FR) [q1+q2] [30h] [10 Credits] 🌐	X	X
⊗ LFSA2212	Innovation classes	Benoît Macq Jean-Pierre Raskin Benoît Raucent	(FR) [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2360	Project in mathematical engineering	Pierre-Antoine Absil Laurent Jacques (compensates Anthony Papavasiliou)	(EN) [q1+q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2120	Applied mathematics seminar	Pierre-Antoine Absil Gianluca Bianchin Frédéric Crevecoeur (coord.) Jean-Charles Delvenne François Glineur Julien Hendrickx Laurent Jacques Raphaël Jungers Estelle Massart (compensates Anthony Papavasiliou) Geovani Nunes Grapiglia	(EN) [q1+q2] [30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2415	Quantitative Energy Economics	Gauthier de Maere d'Aertrycke (compensates Anthony Papavasiliou)	(EN) [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2645	Major technological hazards in industrial activity.	Denis Dochain Aude Simar	(FR) [q2] [30h] [3 Credits] 🌐	X	X
⊗ LACTU2170	STOCHASTIC FINANCE	Donatien Hainaut	(FR) [q2] [30h] [5 Credits] 🌐	X	X
⊗ LACTU2030	LIFE INSURANCE	Donatien Hainaut	(FR) [q1] [45h] [7 Credits] 🌐	X	X
⊗ LLSMS2034	Supply Chain Planning	Marc Foret Mathieu Van Vyve	(EN) [q2] [30h] [5 Credits] 🌐	X	X
⊗ LGBIO2220	Industrial project in biomedical engineering	Sophie Demoustier Philippe Lefèvre Renaud Ronsse	(EN) [q1+q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LELEC2590	Seminars in electronics and communications	Denis Flandre Isabelle Huynen Jérôme Louveaux	(EN) [q2] [30h] [3 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2711	Quality management and control.	Nicolas Bronchart	(FR) [q2] [30h+30h] [5 Credits] 🌐	X	X
⊗ LSTAT2380	Statistical consulting	Christian Ritter	(EN) [q1+q2] [30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LSTAT2390	Applied statistics workshops	Catherine Legrand Christian Ritter	(EN) [q1+q2] [15h] [3 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2399	Industrial seminar in computer science	Yves Deville Bernard Geubelle	(EN) [q2] [30h] [3 Credits] 🌐 > French-friendly	X	X
⊗ LINFO2402	Open Source Project		(EN) [q1+q2] [0h] [5 Credits] 🌐 > French-friendly	X	X

OTHERS ELECTIVE COURSES

OTHERS ELECTIVE COURSES

- Mandatory
- ⊗ Optional
- △ Not offered in 2022-2023
- ⊖ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:

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

o 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	Caroline Klein (coord.)	DE [q1+q2] [30h] [3 Credits] 🌐	X	X
⊗ LALLE2501	Professional development seminar-German	Caroline Klein (coord.)	DE [q1+q2] [30h] [5 Credits] 🌐	X	X
⊗ LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Rocio Cuberos Vicente Paula Lorente Fernandez (coord.)	ES [q1] [30h] [3 Credits] 🌐	X	X
⊗ LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Rocio Cuberos Vicente Paula Lorente Fernandez (coord.)	ES [q1] [30h] [5 Credits] 🌐	X	X
⊗ LNEER2500	Seminar of Entry to professional life in Dutch - Intermediate level	Marie-Laurence Lambrecht (coord.)	NL [q1 or q2] [30h] [3 Credits] 🌐	X	X
⊗ LNEER2600	Seminar of entry to professional life in Dutch - Upper-Intermediate level	Dag Houdmont Marie-Laurence Lambrecht (coord.)	NL [q1 or q2] [30h] [3 Credits] 🌐	X	X

⊗ Group dynamics

⊗ LEPL2351	Group dynamics - Q1	Delphine Ducarme Claude Oestges (coord.) Thomas Pardoën Benoît Raucent	FR [q1] [15h+30h] [3 Credits] 🌐	X	X
⊗ LEPL2352	Group dynamics - Q2	Delphine Ducarme Claude Oestges (coord.) Thomas Pardoën Benoît Raucent	FR [q2] [15h+30h] [3 Credits] 🌐	X	X

⊗ Autres UEs hors-EPL

L'étudiant-e peut choisir maximum 8 ects de cours hors EPL considérés comme non-disciplinaires par la commission de diplôme

Course prerequisites

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

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

Prerequisites and student's annual programme

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

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

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

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

Prerequisites list

MLSMM2134 "E-comportement du consommateur" has prerequisite(s) MGEST1108

- MGEST1108 - [Marketing](#)

MLSMM2136 "Tendances en Digital Marketing" has prerequisite(s) MGEST1108

- MGEST1108 - [Marketing](#)

The programme's courses and learning outcomes

For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies 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.

MAP2M - Information

Access Requirements

Master course admission requirements are defined by the French Community of Belgium Decree of 7 November 2013 defining the higher education landscape and the academic organisation of courses.

General and specific admission requirements for this programme must be satisfied at the time of enrolling at the university.

Unless explicitly mentioned, the bachelor's, master's and licentiate degrees listed in this table or on this page are to be understood as those issued by an institution of the French, Flemish or German-speaking Community, or by the Royal Military Academy.

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

SUMMARY

- > [General access requirements](#)
- > [Specific access requirements](#)
- > [University Bachelors](#)
- > [Non university Bachelors](#)
- > [Holders of a 2nd cycle University degree](#)
- > [Holders of a non-University 2nd cycle degree](#)
- > [Access based on validation of professional experience](#)
- > [Access based on application](#)
- > [Admission and Enrolment Procedures for general registration](#)

Specific access requirements

This programme is taught in English with no prerequisite in French. A certificate is required for the holders of a non-Belgian degree, see selection criteria of the access on the file.

University Bachelors

Diploma	Special Requirements	Access	Remarks
UCLouvain Bachelors			
Bachelor in Engineering		Direct access	Students who have neither major nor minor in the field of their civil engineering Master's degree may have an adapted master programme.
Others Bachelors of the French speaking Community of Belgium			
Bachelor in Engineering		Direct access	Students with a Bachelor's degree in engineering sciences who have not taken the equivalent of a minor in the field of their civil engineering master degree may have an adapted master programme.
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in engineering		Access with additional training	Students who have no specialisation in the field of their civil engineering master degree may have an adapted master programme with up to 60 additional credits.
Foreign Bachelors			
Bachelor in engineering	Bachelors degree of Cluster Institution	Direct access	Students with a Bachelor's degree in engineering sciences who have not taken the equivalent of a minor in the field of their civil engineering master

Bachelor in Engineering	For others institutions	Access based on application	degree may have an adapted master programme. See personalized access
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Non university Bachelors

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

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			

Masters

Master in Engineering	Direct access
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Holders of a non-University 2nd cycle degree

Access based on validation of professional experience

> It is possible, under certain conditions, to use one's personal and professional experience to enter a university course without having the required qualifications. However, validation of prior experience does not automatically apply to all courses. Find out more about [Validation of priori experience](#).

Access based on application

Access based on application : access may be granted either directly or on the condition of completing additional courses of a maximum of 60 ECTS credits, or refused.

The first step of the admission procedure requires to submit an application online: <https://uclouvain.be/en/study/inscriptions/futurs-etudiants.html>

[Selection criteria](#) are summarized here (epl-admission@uclouvain.be).

Admission and Enrolment Procedures for general registration

Unconditional admission to a Master's degree in Applied mathematics engineering is afforded to bachelors in engineering, with a major or minor in applied mathematics.

Admission to this Master's via a customized curriculum is also afforded to bachelors of science (in particular mathematics and physics), bachelors in bioengineering, as well as bachelors in engineering with no major nor minor in applied mathematics, under the following conditions.

A student with no major nor minor in applied mathematics, nor a curriculum deemed equivalent, shall submit a résumé to the Applied mathematics diploma committee, who will propose a customized Master's curriculum (drawing on the volume of elective courses, without any additional credits). The procedure mentioned in note 1 of the conditions of admission applies.

A student who is not a bachelor in engineering, shall submit a résumé to the Faculty of Applied sciences. If this application is accepted, the Faculty will propose a customized Master's curriculum (15 additional credits and possibility part of the volume of elective courses, or else an additional year of studies). The procedure mentioned in note 2 of the conditions of admission applies.

In some cases, a student might have to follow both above-mentioned procedures (when not a bachelor in engineering and with no minor in applied mathematics). The procedures mentioned in notes 1 and 2 of the conditions of admission then apply.

Teaching method

Interdisciplinary methods

The Master's degree programme in engineering and Applied Mathematics is by its very nature interdisciplinary because it consists of a wide range of major courses some of which are research-based (Cryptography and information security, biomedical engineering) and offered by other academic departments (financial mathematics); this naturally reinforces the interdisciplinary nature of the programme.

The programme aims to give students knowledge and skills in mathematical modelling that is used in all engineering disciplines as well as in other areas such as economics, environmental sciences or life sciences.

A final interdisciplinary aspect to the programme is the graduation project, which is frequently completed outside the department of mathematical engineering. The graduation project makes up half of the workload for the second year of the programme. It offers students the opportunity to work in-depth on a given subject and due to its size and context, introduces students to the engineering or research professions. This project may focus on a topic relating to an applied mathematics research cluster (or possibly in collaboration with an external industrial partner); or it may focus on subjects related to applied mathematics in other research clusters at the Louvain School of Engineering as well as the faculties of science, economics, management or actuarial sciences.

Diverse learning situations

The pedagogy used in the Master's degree programme in engineering is similar to that in the Bachelor's degree programme in engineering. Students are exposed to a variety of pedagogies: lectures, individual projects and small group work, exercise and problem-solving sessions, case studies, experimental laboratories, computer simulations, educational software, internships in industry or research, individual or group work, seminars given by external scientists.

These various learning situations develop students' knowledge of their discipline in a way that is interdisciplinary and non-technical. They permit students to build their knowledge in an iterative and progressive manner all the while developing their independence, organisational and time management skills as well as their ability to communicate. Students have access to the newest information technology (materials, software, networks) during their studies.

For example, the Business Creation major has an interactive approach and promotes "problem-based learning". Throughout the programme, students must work as part of multidisciplinary teams. The project has an interdisciplinary focus and groups of three students, ideally from different faculties, may collaborate on a business creation project.

Evaluation

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".

Evaluation methods conform to the rules used to evaluate coursework and exams. Further details about the methods specific to each academic department may be found in their respective evaluation descriptions ("Evaluating students' knowledge").

Student work is evaluated according to University rules (see the rules for evaluating coursework and exams) namely written and oral exams, laboratory exams, individual or group work, public presentations of projects and theses defences.

For more information on evaluation methods, students may consult the relevant evaluation descriptions.

To obtain a passing grade, the marks received for the teaching units are offset by their respective credits.

Mobility and/or Internationalisation outlook

Since its creation, the Louvain School of Engineering (EPL) has participated in diverse [exchange programs](#) that were put into place at the European level and beyond.

Possible trainings at the end of the programme

The Master's degree programme in engineering and Applied Mathematics satisfies the prerequisites for other Master's degree programmes that may be obtained upon completion of an additional year:

1. Master [120] en sciences actuarielles (UCLouvain)

Students who take LINMA2725, LACTU2020, LACTU2030, LACTU2070 and at least 15 credits in the Complement to the major in financial mathematics (see "Elective courses") will get direct access to the second year of the Master [120] en sciences actuarielles.

2. Master's degree [120] in general economics (UCLouvain)

Students who take 30 credits in the Module en biostatistique et technométrie will be able to complete in one year the Master [120] en statistique, orientation biostatistique.

3. Master's degree [120] in general statistics (UCLouvain)

Students who take 30 credits in the Module en statistique générale et mathématique will be able to complete in one year the Master [120] en statistique, orientation générale.

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

- Different Master's degree programmes (60) in management (automatic admission based on written application): see this list
- The Master's degree (60) in information and communication at Louvain-la-Neuve or the Master's degree (60) in information and communication at Mons

Doctoral degree programmes

Enrolment in a doctoral degree programme in engineering sciences is open to students holding a Master's degree in civil engineering. The Institute ICTEAM is associated with several specialised doctoral schools in particular the school "Systems, Optimization, Control and Networks" (for details see <https://uclouvain.be/sites/socn/>).

Contacts

Curriculum Management

Entity

Structure entity

Denomination

Faculty

Sector

Acronym

Postal address

SST/EPL/MAP

(MAP)

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