

MAP2M

2016 - 2017

Master [120] in Mathematical Engineering

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In englishDissertation/Graduation Project : **YES** - Internship : **optional**Activities in other languages : **YES**Activities on other sites : **NO**Main study domain : **Sciences de l'ingénieur et technologie**Organized by: **Ecole Polytechnique de Louvain (EPL)**Programme code: **map2m** - Francophone Certification Framework: 7**Table of contents**

Introduction	2
Teaching profile	3
- Learning outcomes	3
- Programme structure	4
- Detailed programme	5
- Programme by subject	5
- Course prerequisites	19
- The programme's courses and learning outcomes	19
Information	20
- Admission	20
- Teaching method	24
- Evaluation	24
- Mobility and/or Internationalisation outlook	24
- Possible trainings at the end of the programme	24
- Contacts	25

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 engineering complex systems for 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 sciences or daily life.

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 advancement in the life sciences, environment, finance or economics;
- want to take advantage of the most recent research advances in your area of specialisation.

Your future job

Civil engineers are present in all industrial sectors: industrial chemistry, pharmaceutical and food industries, electronics and telecommunications, energy, metallurgy, aeronautics, design and 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 engineering sciences fields;
- flexibility when it comes to building your programme (major and elective courses compose more than half of the programme);
- the chance to complete part of the programme abroad or at KULeuven;
- automatic access to the second year Master's degree programme in economics, statistics 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. demonstrate mastery of a solid body of knowledge of the fundamentals of science in general and engineering sciences in particular, which will allow you to understand and solve problems relating to engineering:

- 1.1 Identify and implement concepts, laws, reasoning applicable to a given problem
- 1.2 Identify and use modelling and calculation tools to solve problems
- 1.3 Check the credibility of solutions to problems

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 a hypotheses relating to the phenomenon being studied
- 3.3 Write a cumulative report that explains the potential of the theoretical or technical innovations resulting from the research project

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

- 4.1 Frame and explain the project's objectives (in terms of performance indicators) while taking into account its issues and constraints (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. Ideally you are able to communicate in one or more foreign language in addition to French

- 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 (40 credits), including at least 10 credits in the "professional exposure" block.
- 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).

The student's curriculum will be scrutinized for acceptance by the Mathematical Engineering diploma committee.

For a programme-type, and regardless of the focus, options/or elective courses selected, this master will carry a minimum of 120 credits divided over two annual units, corresponding to 60 credits each.

[> Core curriculum for the Master's degree in Engineering and Applied Mathematics](#)

[\[en-prog-2016-map2m-lmap220t.html \]](#)

[> Professional focus](#) [\[en-prog-2016-map2m-lmap220s \]](#)

[Options courses](#)

- > [Majors for the Master's degree in mathematical engineering](#) [\[en-prog-2016-map2m-lmap902r.html \]](#)
 - > [Major in Optimization and operations research engineering](#) [\[en-prog-2016-map2m-lmap221o.html \]](#)
 - > [Major in Systems and control engineering](#) [\[en-prog-2016-map2m-lmap222o.html \]](#)
 - > [Major in Computational engineering](#) [\[en-prog-2016-map2m-lmap223o.html \]](#)
 - > [Major in Data science](#) [\[en-prog-2016-map2m-lmap224o.html \]](#)
 - > [Major in Financial mathematics](#) [\[en-prog-2016-map2m-lmap226o.html \]](#)
 - > [Major in Cryptography and information security](#) [\[en-prog-2016-map2m-lmap234o.html \]](#)
 - > [Major in biomedical engineering](#) [\[en-prog-2016-map2m-lmap230o.html \]](#)
- > [Majors in business creation and management](#) [\[en-prog-2016-map2m-lmap903r.html \]](#)
 - > [Major in small and medium sized business creation](#) [\[en-prog-2016-map2m-lmap232o.html \]](#)
 - > [Major in business risks and opportunities](#) [\[en-prog-2016-map2m-lmap231o.html \]](#)
- > [Elective courses](#) [\[en-prog-2016-map2m-lmap910r.html \]](#)
 - > [Elective courses available to students enrolled in the Master's degree in mathematical engineering](#) [\[en-prog-2016-map2m-lmap229o.html \]](#)

MAP2M Detailed programme

Programme by subject

CORE COURSES [40.0]

- Mandatory
 △ Courses not taught during 2016-2017
 ⊕ Periodic courses taught during 2016-2017
- ☒ Optional
 ⊖ Periodic courses not taught during 2016-2017
 ■ Activity with requisites

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

Students may choose

						Year	
						1	2
○ LINMA2990	Graduation project/End of studies project	Nathalie.Ponet (coord.)		28 Credits			x

○ Religion courses for students in natural sciences (2 credits)

The student shall select

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

○ Professional exposure

min=10 credits parmi

☒ LFSA2995	Company Internship	Jean-Pierre.Raskin	30h	10 Credits	1 + 2q	x	x
☒ LFSA2996	Company Internship			5 Credits	1 + 2q	x	x
☒ LINMA2120	Applied mathematics seminar	Pa.Absil Jean-Charles.Delvenne (coord.) Francois.Glineur Julien.Hendrickx Yurii.Nesterov Anthony.Papavasiliou	30h	5 Credits	1 + 2q	x	x
☒ LINMA2360	Project in mathematical engineering	Pa.Absil Yurii.Nesterov Anthony.Papavasiliou (coord.)	30h +22.5h	5 Credits	1 + 2q	x	x

PROFESSIONAL FOCUS [30.0]

○ Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

						Year	
						1	2
○ LINMA2171	Numerical Analysis : Approximation, Interpolation, Integration	Pa.Absil	30h +22.5h	5 Credits	1q	x	
○ LINMA2370	Modelling and analysis of dynamical systems	Jean-Charles.Delvenne Denis.Dochain (coord.)	30h +22.5h	5 Credits	1q	x	
○ LINMA2380	Matrix computations	Paul.Vandooren	30h +22.5h	5 Credits	1q	x	
○ LINMA2470	Stochastic modelling	Philippe.Chevalier	30h +22.5h	5 Credits	2q	x	
○ LINMA2471	Optimization models and methods	Francois.Glineur	30h +22.5h	5 Credits	1q	x	
○ LINMA2710	Scientific computing	Pa.Absil (coord.) Anthony.Papavasiliou	30h +22.5h	5 Credits	2q	x	

OPTIONSMajors for the Master's degree in mathematical engineering

- > Major in Optimization and operations research engineering [en-prog-2016-map2m-lmap221o]
- > Major in Systems and control engineering [en-prog-2016-map2m-lmap222o]
- > Major in Computational engineering [en-prog-2016-map2m-lmap223o]
- > Major in Data science [en-prog-2016-map2m-lmap224o]
- > Major in Financial mathematics [en-prog-2016-map2m-lmap226o]
- > Major in Cryptography and information security [en-prog-2016-map2m-lmap234o]
- > Major in biomedical engineering [en-prog-2016-map2m-lmap230o]

Majors in business creation and management

- > Major in small and medium sized business creation [en-prog-2016-map2m-lmap232o]
- > Major in business risks and opportunities [en-prog-2016-map2m-lmap231o]

Elective courses

- > Elective courses available to students enrolled in the Master's degree in mathematical engineering [en-prog-2016-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

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

The student shall select

De 20 à 25 credits parmi

						Year	
						1	2
⊗ LINMA2415	Quantitative Energy Economics	Anthony.Papavasiliou	30h +22.5h	5 Credits	2q	x	x
⊗ LINMA2450	Combinatorial optimization	Jean-Charles.Delvenne Julien.Hendrickx	30h +22.5h	5 Credits	1q	x	x
⊗ LINMA2460	Optimization : Nonlinear programming	Yurii.Nesterov	30h +22.5h	5 Credits	2q	x	x
⊗ LINMA2491	Operational Research	Anthony.Papavasiliou	30h +22.5h	5 Credits	2q	x	x
⊗ LINMA2345	Game theory	Raphael.Jungers	30h +22.5h	5 Credits	2q	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

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

The student shall select

De 20 à 25 credits parmi

						Year	
						1	2
⊗ LINMA2361	Nonlinear dynamical systems	Pa.Absil	30h +22.5h	5 Credits	1q	x	x
⊗ LINMA2671	Advanced control and applications	Julien.Hendrickx	30h+30h	5 Credits	1q	x	x
⊗ LINMA2875	System Identification	Julien.Hendrickx	30h+30h	5 Credits	2q	x	x
⊗ LGBIO2060	Modelling of biological systems	Philippe.Lefevre	30h+30h	5 Credits	1q	x	x
⊗ LMAPR2510	Mathematical ecology	Eric.Deleersnijder Emmanuel.Hanert Thierry.Vaneffelterre	30h +22.5h	5 Credits	2q	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

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

The student shall select

De 20 à 25 credits parmi

						Year	
						1	2
⊗ LGCIV2041	Numerical analysis of civil engineering structures	Jean-Francois.Remacle	30h+15h	5 Credits	1q	x	x
⊗ LINMA2111	Discrete mathematics II : Algorithms and complexity	Vincent.Blondel Jean-Charles.Delvenne (coord.)	30h +22.5h	5 Credits	1q	x	x
⊗ LINMA2720	Mathematical modelling of physical systems	Roland.Keunings	30h +22.5h	5 Credits	2q	x	x
⊗ LMECA2170	Numerical Geometry	Vincent.Legat Jean-Francois.Remacle	30h+30h	5 Credits	1q	x	x
⊗ LMECA2300	Advanced Numerical Methods	Philippe.Chatelain Christophe.Craeye Vincent.Legat Jean-Francois.Remacle	30h+30h	5 Credits	2q	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

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

The student may choose

De 20 à 30 credits parmi

Year

1 2

● Compulsory courses in data science

● LINMA2472	Algorithms in data science	Vincent.Blondel (coord.) Jean-Charles.Delvenne Gautier.Krings (compensates Vincent Blondel)	30h +22.5h	5 Credits	1q	x	x
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⊗ Elective courses in data science

⊗ LELEC2870	Machine Learning : regression, dimensionality reduction and data visualization	John.Lee (compensates Michel Verleysen) Michel.Verleysen	30h+30h	5 Credits	1q	x	x
⊗ LINGI2145	Cloud Computing	Damien.Leroy	30h+15h	5 Credits	1q	x	x
⊗ LINGI2172	Databases	Siegfried.Nijssen	30h+30h	6 Credits	2q	x	x
⊗ LINGI2262	Machine Learning :classification and evaluation	Pierre.Dupont	30h+30h	5 Credits	2q	x	x
⊗ LSINF2275	Data mining & decision making	Marco.Saerens	30h+15h	5 Credits	2q	x	x
⊗ LSTAT2020	Statistical computing	Celine.Bugli (compensates Bernadette Govaerts) Bernadette.Govaerts	20h+20h	6 Credits	1q	x	x
⊗ LSTAT2360	Seminar in data management: basic	Catherine.Legrand	7.5h+10h	5 Credits	1 ou 2q	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, students taking INMA2725, ACTU2020, ACTU2030, ACTU2070 and at least 15 credits from the complementary module in financial mathematics (see the section on "elective courses") as part of their elective courses are automatically admitted to the second year of the Master's degree programme (120) in actuarial sciences.

● Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

The student shall select

De 15 à 20 credits parmi

						Year	
						1	2
⊗ LINMA2725	Financial mathematics	Pierre.Devolder	30h +22.5h	5 Credits	1q	x	x
⊗ LACTU2020	Fixed income mathematics	Pierre.Devolder	30h+15h	5 Credits	1q	x	x
⊗ LACTU2030	LIFE INSURANCE 1	Francoise.Gilles	30h+15h	5 Credits	1q	x	x
⊗ LACTU2070	STOCHASTIC FINANCE 1	Donatien.Hainaut	30h	5 Credits	2q	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

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

The student shall select
De 15 à 30 credits parmi

Year

1 2

⊗ Elective courses

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

⊗ LELEC2760	Secure electronic circuits and systems	Francois-Xavier.Standaert	30h+30h	5 Credits	2q	X	X
⊗ LINGI2144	Secured systems engineering	Gildas.Avoine	30h+15h	5 Credits	1q	X	X
⊗ LINGI2347	Computer system security	Ramin.Sadre	30h+15h	5 Credits	2q	X	X
⊗ LINGI2348	Information theory and coding	Jerome.Louveaux Jerome.Louveaux (compensates Olivier Pereira) Benoit.Macq (coord.) Olivier.Pereira	30h+15h	5 Credits	2q	X	X
⊗ LMAT2440	Number theory	Olivier.Pereira Thomas.Peters (compensates Olivier Pereira) Jean-Pierre.Tignol	30h+15h	5 Credits	1q	X	X
⊗ LMAT2450	Cryptography	Francois.Koeune (compensates Olivier Pereira) Olivier.Pereira Thomas.Peters (compensates Olivier Pereira) Francois-Xavier.Standaert (compensates Olivier Pereira)	30h+15h	5 Credits	1q	X	X

MAJOR IN BIOMEDICAL ENGINEERING

As with most of the civil engineering programmes, 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
- △ Courses not taught during 2016-2017
- ⊕ Periodic courses taught during 2016-2017
- ⊗ Optional
- ⊖ Periodic courses not taught during 2016-2017
- Activity with requisites

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

The student may choose
De 15 à 30 credits parmi

Year

1 2

○ Required courses in biomedical engineering

Students enrolled in this major must select a minimum of 15 credits among the following required 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	Pierre.Dupont Michel.Ghislain	30h+30h	5 Credits	2q	x	x
⊗ LGBIO2020	Bioinstrumentation	Andre.Mouraux Michel.Verleysen	30h+30h	5 Credits	1q	x	x
⊗ LGBIO2030	Biomaterials	Sophie.Demoustier Christine.Dupont Gaetane.Leloup	30h+30h	5 Credits	1q	x	x
⊗ LGBIO2040	Biomechanics	Francois.Henrotte	30h+30h	5 Credits	2q	x	x
⊗ LGBIO2050	Medical Imaging	Anne.Bol John.Lee Benoit.Macq Frank.Peeters	30h+30h	5 Credits	1q	x	x
⊗ LGBIO2060	Modelling of biological systems	Philippe.Lefevre	30h+30h	5 Credits	1q	x	x

⊗ Elective courses in biomedical engineering for students enrolled in the ELEC Master's degree programme

⊗ LELEC2870	Machine Learning : regression, dimensionality reduction and data visualization	John.Lee (compensates Michel.Verleysen) Michel.Verleysen	30h+30h	5 Credits	1q	x	x
⊗ LELEC2885	Image processing and computer vision	Christophe.Devleeschouwer Laurent.Jacques	30h+30h	5 Credits	1q	x	x

MAJORS IN BUSINESS CREATION AND MANAGEMENT**MAJOR IN SMALL AND MEDIUM SIZED BUSINESS CREATION**

The goal of this major is to familiarise engineering students with the specifics of small and medium sized businesses, entrepreneurship, and business creation so they may develop the necessary skills, knowledge and tools to create a business. This major is reserved for a small number of students and selection is based on a written application and individual interview. The written application must be submitted before the start of the academic year for Master's 1.

Applications may be sent to:

Secrétariat CPME-Place des Doyens, 1
1348 Louvain-la-Neuve (tel. 010/47 84 59)

Selected students will replace their Master's thesis in the common core curriculum with a thesis related to business creation (the number of credits remaining the same).

● Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

○ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

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

De 20 à 25 crédits parmi

Year

1 2

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

● LCPME2001	Entrepreneurship Theory (in French)	Frank.Janssen	30h+20h	5 Credits	1q	x	
● LCPME2002	Managerial, legal and economic aspects of the creation of a company (in French)	Regis.Coeurderoy Yves.Decordt Marine.Falize (compensates Régis Coeurderoy)	30h+15h	5 Credits	1q	x	x
● LCPME2003	Business plan of the creation of a company (in French)	Frank.Janssen	30h+15h	5 Credits	2q		x
● LCPME2004	Advanced seminar on Entrepreneurship (in French)	Roxane.DeHoe (compensates Frank Janssen) Frank.Janssen	30h+15h	5 Credits	2q	x	x

⊗ Prerequisite CPME courses

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

● LCPME2000	Venture creation financement and management I	Olivier.Giacomin Paul.Vanzeveren	30h+15h	5 Credits	1q	x	
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MAJOR IN BUSINESS RISKS AND OPPORTUNITIES

As with most Master's degree programmes in civil engineering, the objective of this major is to familiarise the student with the basic principles of business management.

Students may be exempted from certain of these classes provided they have completed similar courses or activities as part of their previous coursework or training. The exempted courses are replaced by in-depth courses from the core curriculum for the Master's degree in business management and/or a technological project completed in collaboration with students from LSM.

- Mandatory
- △ Courses not taught during 2016-2017
- ⊕ Periodic courses taught during 2016-2017
- ⊗ Optional
- ⊖ Periodic courses not taught during 2016-2017
- Activity with requisites

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

This major may not be taken at the same time as the major in small and medium business creation. Students selecting this major may choose

De 16 à 20 credits parmi

						Year	
						1	2
⊗ LFSA2140	Elements of law for industry and research	Fernand.Devisscher Werner.Derijcke Benedicte.Inghels	30h	3 Credits	1q	x	x
⊗ LFSA2230	Introduction to management and to business economics	Benoit.Gailly Vincent.Reuter (compensates Benoît Gailly)	30h+15h	4 Credits	2q	x	x
⊗ LFSA1290	Introduction to financial and accounting management	Andre.Nsabimana (compensates Gerrit Sarens) Gerrit.Sarens	30h+15h	4 Credits	2q	x	x
⊗ LFSA2202	Ethics and ICT	Axel.Gosseries Maxime.Lambrecht (compensates Olivier Pereira) Olivier.Pereira	30h	3 Credits	2q	x	x
⊗ LFSA2245	Environment and business	Thierry.Brechet	30h	3 Credits	1q	x	x
⊗ LFSA2210	Organisation and human resources	John.Cultiaux	30h	3 Credits	2q	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.

ELECTIVE COURSES

ELECTIVE COURSES AVAILABLE TO STUDENTS ENROLLED IN THE MASTER'S DEGREE IN MATHEMATICAL ENGINEERING

○ Mandatory

△ Courses not taught during 2016-2017

⊕ Periodic courses taught during 2016-2017

⊗ Optional

⊖ Periodic courses not taught during 2016-2017

■ Activity with requisites

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

Students must accumulate a minimum of 120 credits over the course of their Master's degree programme.

Year

1 2

⊗ Complement to the major in financial mathematics

Students taking 15 credits in this module as well as LINMA2725, LACTU 2020, LACTU2030 and LACTU2070 will be automatically admitted to the second year of the Master's degree programme in actuarial sciences. This module is intended only for students who plan to use the financial mathematics major to eventually enrol in the actuarial sciences programme.

⊗ LACTU2010	NON LIFE INSURANCE 1	Michel.Denuit	30h+15h	5 Credits	1q	X	X
⊗ LACTU2040	PENSION FUNDING	Pierre.Devolder	30h+15h	5 Credits	2q	X	X
⊗ LACTU2060	LIFE INSURANCE 2	Michel.Denuit Donatien.Hainaut	30h	5 Credits	2q	X	X
⊗ LACTU2080	REINSURANCE	Jean-Francois.Walhin	30h	5 Credits	2q	X	X

⊗ Module en biostatistique et technométrie

Les étudiants qui suivent 30 crédits dans ce module pourront réaliser en un an le Master en statistique, orientation biostatistique [120 crédits]. Plus d'informations concernant ces cours et cette passerelle peuvent être obtenues via le Secrétariat de l'Ecole en statistique, biostatistique et sciences actuarielles (LSBA): info-stat-actu@uclouvain.be

⊗ LBIRA2101	Biometry : analysis of the variance	Xavier.Draye (coord.) Anouar.Elghouch Bernadette.Govaerts	30h+15h	4 Credits	1q	X	X
⊗ LBIRC2106	Chemometrics	Bernadette.Govaerts	22.5h +15h	3 Credits	1q	X	X
⊗ LSTAT2040	Statistical analysis	Anouar.Elghouch Anouar.Elghouch (compensates Ingrid Van Keilegom) Ingrid.Vankeilegom	30h+15h	5 Credits	2q	X	X
⊗ LSTAT2130	Introduction to Bayesian statistics.	Philippe.Lambert	15h+5h	4 Credits	2q	X	X
⊗ LSTAT2220	Analysis of survival and duration data	Ingrid.Vankeilegom	15h+5h	4 Credits	1q	X	X
⊗ LSTAT2310	Statistical quality control.	Bernadette.Govaerts	15h+5h	4 Credits	1q	X	X
⊗ LSTAT2330	Statistics in clinical trials.	Catherine.Legrand Annie.Robert	22.5h +7.5h	5 Credits	2q	X	X
⊗ LSTAT2360	Seminar in data management: basic	Catherine.Legrand	7.5h+10h	5 Credits	1 ou 2q	X	X
⊗ LSTAT2370	Data Management II : SAS ADVANCED PROGRAMMING	Catherine.Legrand	7.5h+25h	6 Credits	2q	X	X

⊗ Module en statistique générale et mathématique

Les étudiants qui suivent 30 crédits dans ce module pourront réaliser en un an le Master en statistique, orientation générale [120 crédits]. Plus d'informations concernant ces cours et cette passerelle peuvent être obtenues via le Secrétariat de l'Ecole en statistique, biostatistique et sciences actuarielles (LSBA): info-stat-actu@uclouvain.be

⊗ LELEC2870	Machine Learning : regression, dimensionality reduction and data visualization	John.Lee (compensates Michel Verleysen) Michel.Verleysen	30h+30h	5 Credits	1q	X	X
⊗ LINGI2262	Machine Learning :classification and evaluation	Pierre.Dupont	30h+30h	5 Credits	2q	X	X
⊗ LINMA2472	Algorithms in data science	Vincent.Blondel (coord.) Jean-Charles.Delvenne Gautier.Krings (compensates Vincent Blondel)	30h +22.5h	5 Credits	1q	X	X

Year

1 2

⊗ LSINF2275	Data mining & decision making	Marco.Saerens	30h+15h	5 Credits	2q	x	x
⊗ LSTAT2020	Statistical computing	Celine.Bugli (compensates Bernadette.Govaerts)	20h+20h	6 Credits	1q	x	x
⊗ LSTAT2040	Statistical analysis	Anouar.Elghouch Anouar.Elghouch (compensates Ingrid Van Keilegom)	30h+15h	5 Credits	2q	x	x
⊗ LSTAT2110	Data Analysis	Johan.Segers	22.5h +7.5h	5 Credits	1q	x	x
⊗ LSTAT2120	Linear models	Christian.Hafner	30h+7.5h	5 Credits	1q	x	x
⊗ LSTAT2130	Introduction to Bayesian statistics.	Philippe.Lambert	15h+5h	4 Credits	2q	x	x
⊗ LSTAT2150	Nonparametric statistics: smoothings methods	Rainer.Vonsachs	15h+5h	4 Credits	1q	x	x
⊗ LSTAT2170	Times series	Rainer.Vonsachs	22.5h +7.5h	5 Credits	2q	x	x
⊗ LSTAT2180	Resampling methods with applications	Anouar.Elghouch Germain.Vanbever (compensates Anouar El Ghouch)	15h+5h	4 Credits	1q	x	x
		Germain.Vanbever (compensates Ingrid Van Keilegom)					
		Ingrid.Vankeilegom					
⊗ LSTAT2360	Seminar in data management: basic	Catherine.Legrand	7.5h+10h	5 Credits	1 ou 2q	x	x
⊗ LFSA2212	Innovation classes	Pierre.Latteur Benoit.Macq Benoit.Raucent	30h+15h	5 Credits	1q	x	x
⊗ LFSA2351A	Group dynamics	Piotr.Sobieski (coord.) Vincent.Wertz (coord.)	15h+30h	3 Credits	1q	x	x
⊗ LFSA2351B	Group dynamics	Piotr.Sobieski (coord.) Vincent.Wertz (coord.)	15h+30h	3 Credits	2q	x	x

⊗ General knowledge courses

Students can also include in their curriculum any course given at UCL, KULeuven subject to approval of the Programme committee.

Students can also include in their curriculum any course given at UCL or FIW / KULeuven subject to approval of the Diploma committee.

⊗ Courses of interest

⊗ LECON2021	Economic Fluctuations and Foundations of Macro Polici	David.Delacroix Jean-Francois.Fagnart (compensates David De la Croix)	30h	5 Credits	2q	x	x
⊗ LECON2031	Applied Econometrics : Time Series	Zhengyuan.Gao	30h+12h	5 Credits	1q	x	x
⊗ LECON2033	Applied econometrics: Microeconomics	Muriel.Dejemeppe	30h+12h	5 Credits	1q	x	x
⊗ LELEC1350	APPLIED ELECTROMAGNETISM	Christophe.Craeye Danielle.Vanhoenacker	30h+30h	5 Credits	1q	x	x
⊗ LELEC1360	TELECOMMUNICATIONS	Luc.Vandendorpe	30h+30h	5 Credits	2q	x	x
⊗ LELEC2880	Modem design	Jerome.Louveaux Luc.Vandendorpe	30h+30h	5 Credits	2q	x	x
⊗ LELEC2885	Image processing and computer vision	Christophe.Devleeschouwer Laurent.Jacques	30h+30h	5 Credits	1q	x	x
⊗ LELEC2900	Signal processing	Benoit.Macq Luc.Vandendorpe	30h+30h	5 Credits	2q	x	x
⊗ LINGI1123	Computability and complexity	Yves.Deville	30h+30h	5 Credits	2q	x	x

						Year	
						1	2
✘ LINGI2348	Information theory and coding	Jerome.Louveaux Jerome.Louveaux (compensates Olivier Pereira) Benoit.Macq (coord.) Olivier.Pereira	30h+15h	5 Credits	2q	x	x
✘ LMAT1371	Probability Theory	Johan.Segers	30h +22.5h	5 Credits	2q	x	x
✘ LMAT2130	Partial differential equations : Poisson and Laplace equations	Augusto.Ponce Jean.Vanschafingen	30h+30h	5 Credits	2q	x	x
✘ LMAT2410	Partial differential equation : heat equation, brownian moves and numerical aspects	Augusto.Ponce Jean.Vanschafingen	30h+15h	5 Credits	2q	x	x
✘ LMAT2460	Finite mathematics and combinatorial structures	Jean-Charles.Delvenne Jean-Pierre.Tignol	30h	5 Credits	1q	x	x
✘ LMECA1100	Deformable solid mechanics.	Issam.Doghri	30h+30h	5 Credits	2q	x	x
✘ LMECA1321	Fluid mechanics and transfer phenomena.	Vincent.Legat Gregoire.Winckelmans	30h+30h	5 Credits	2q	x	x
✘ LMECA2141	Rheology	Vincent.Legat Evelyne.Vanruymbeke	30h+30h	5 Credits	1q	x	x
✘ LMECA2771	Thermodynamics of irreversible phenomena.	Miltiadis.Papalexandris	30h+30h	5 Credits	2q	x	x
✘ LMECA2660	Numerical methods in fluid mechanics	Gregoire.Winckelmans	30h+30h	5 Credits	2q	x	x
✘ LMECA2732	Introduction to robotics	Renaud.Ronsse	30h+30h	5 Credits	2q	x	x
✘ LSINF1121	Algorithmics and data structures	Pierre.Schaus	30h+30h	5 Credits	1q	x	x
✘ LSTAT2100	Discrete data analysis.	Patrick.Bogaert Anouar.Elghouch	30h+7.5h	5 Credits	2q	x	x
✘ LSTAT2350	Data Mining	Libei.Chen	15h+15h	5 Credits	2q	x	x

✘ Languages

Students may select from any language course offered at the ILV for a maximum of 3 credits out of the 120 core credits needed for their Master's degree. Special attention is placed on the following seminars in professional development:

Students may include in their electives any language course of the Institute of Modern Languages (ILV) for a maximum of 3 credits within the 120 basic credits of their Master's. Their attention is drawn to the following professional insertion seminars:

✘ LALLE2500	Professional development seminar German	Caroline.Klein Ann.Rinder (coord.)	30h	3 Credits	1 + 2q	x	x
✘ LALLE2501	Professional development seminar-German	Caroline.Klein Ann.Rinder (coord.)	30h	5 Credits	1 + 2q	x	x
✘ LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula.Lorente (coord.)	30h	3 Credits	1q	x	x
✘ LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula.Lorente (coord.)	30h	5 Credits	1q	x	x
✘ LNEER2500	Professional development seminar: Dutch - intermediate level	Isabelle.Demeulenaere (coord.) Mariken.Smit	30h	3 Credits	1 ou 2q	x	x
✘ LNEER2600	Professional development seminar: Dutch - upper-intermediate level	Isabelle.Demeulenaere (coord.)	30h	3 Credits	1 ou 2q	x	x

✘ Short-term exchanges (2 credits)

Students may include in their curriculum any BEST or ATHENS course subject to approval by the programme committee. These courses are worth 2 credits.

Students may include in their curriculum any BEST or ATHENS subject to approval by the Diploma committee. These courses are worth 2 credits

Course prerequisites

A document entitled [en-prerequis-2016-map2m.pdf](#) specifies the activities (course units - CU) with one or more pre-requisite(s) within the study programme, that is the CU whose learning outcomes must have been certified and for which the credits must have been granted by the jury before the student is authorised to sign up for that activity.

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

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

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

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

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

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

The programme's courses and learning outcomes

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

The document is available by clicking [this link](#) after being authenticated with UCL account.

MAP2M - Information

Admission

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

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.

- [University Bachelors](#)
- [Non university Bachelors](#)
- [Holders of a 2nd cycle University degree](#)
- [Holders of a non-University 2nd cycle degree](#)
- [Adults taking up their university training](#)
- [Personalized access](#)

University Bachelors

Diploma	Special Requirements	Access	Remarks
UCL Bachelors			
Bachelor in engineering [180.0]	Major or minor in applied mathematics	Direct access	
Bachelor in engineering [180.0]		Access with additional training	Students who have neither majored nor minored in the field of their civil engineering Master's degree, must submit a written application in which they list their detailed course curriculum (list of course work and marks year by year) to the programme commission. The commission will then suggest a programme in keeping with the student's previous course of study with the possible addition of a maximum of 15 supplemental credits.
Bachelor in physics [180.0] Bachelor in mathematics [180.0] Bachelor in computer science [180.0] Bachelor in chemistry [180.0] Bachelor in biology [180.0] Bachelor in geography [180.0] Bachelor in bioengineering [180.0]	Minor in applied mathematics	Access with additional training	The jury may admit candidates with excellent academic records and training on the basis of their written application provided that they integrate a maximum of 60 additional credits into their Master's degree programme. A minor in engineering sciences (Applied mathematics) is considered an advantage for candidates seeking this type of admission

Others Bachelors of the French speaking Community of Belgium			
Bachelor in engineering [180.0]	Major or minor in applied mathematics	Direct access	
Bachelor in engineering [180.0]		Access with additional training	Students with a Bachelor's degree in engineering sciences (with a focus on mathematics engineering) who have not taken the equivalent of a minor in mathematics must submit a written application to the mathematics programme commission in which they list their detailed course curriculum (list of course work and marks year by year). The jury will suggest a programme in keeping with the student's previous course of study with the possible addition of a maximum of 15 supplemental credits.
Bachelor in physics, mathematics, computer science, chemistry, biology, geography, bioengineering [180.0]	Option in applied mathematics at former institution	Access with additional training	The jury may admit candidates with excellent academic records and training on the basis of their written application provided that they integrate a maximum of 60 additional credits into their Master's degree programme. A minor in engineering sciences (applied mathematics) is considered an advantage for candidates seeking this type of admission
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in ingenieurs wetenschappen	Option in applied mathematics at former institution	Direct access	
Bachelor in ingenieurs wetenschappen		Access with additional training	Students who have no specialisation in applied mathematics must submit a written application to the programme commission in applied mathematics engineering in which they list their detailed course curriculum (list of course work and marks year by year). The jury will suggest a programme in keeping with the student's previous course of study with the possible addition of a maximum of 15 supplemental credits.
Bachelor's degree equivalent to one of those required from graduates of the French-speaking community	Option in applied mathematics at former institution	Access with additional training	Students without a Bachelor's degree in engineering sciences (with a focus on applied mathematics engineering) must submit a written application to EPL in which they list their detailed course curriculum (list of course work and marks year by year). The

			jury will determine whether the student may be admitted (based solely on the common Bachelor's degree training for engineering sciences (with a focus on applied mathematics engineering) and their decision will be in keeping with the rules pertaining to bridge years. When necessary, the jury may suggest a programme in keeping with the student's previous course of study with the possible addition of a maximum of 15 supplemental credits.
Foreign Bachelors			
Bachelor in engineering	Bachelors from the Cluster network	Direct access	Conditions imposed on UCL engineering Bachelor.
Bachelor in engineering	Other institutions	Access with additional training	Students will submit a written application for admission to EPL in which they list their detailed course curriculum (list of course work and marks year by year). The jury will determine whether the candidate may be admitted according to the regulations. Where necessary the jury may suggest a programme in keeping with the student's previous course of study with the possible addition of a maximum of 15 supplemental credits.

Non university Bachelors

Diploma	Access	Remarks
> Find out more about links to the university		

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
Engineers, bioengineers, and graduates in computer science, chemistry, physics, mathématiques, biology or geography, considered equivalent to corresponding Bachelor's.		Direct access	
Masters			
Master in engineering		Direct access	

Holders of a non-University 2nd cycle degree

Diploma	Access	Remarks
> Find out more about links to the university		

Adults taking up their university training

> See the website [Valorisation des acquis de l'expérience](#)

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

Personalized access

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

Students may submit an application for admission to the Louvain School of Engineering in which they list their detailed course curriculum (list of course work and marks year by year). The School in collaboration with the relevant programme commission will determine whether the student may be admitted and their decision will respect the programme rules. When necessary, they may suggest an individualised programme consisting of a part of the elective courses in the relevant Master's degree programme in civil engineering with the possible addition of a maximum of 15 supplemental credits.

The School in collaboration with the relevant programme commission will determine whether the student may be admitted and their decision will respect the programme rules. When necessary, the jury may suggest a programme in keeping with the student's previous course of study with the possible addition of a maximum of 15 supplemental credits.

Admission and Enrolment Procedures for general registration

Specific procedures :

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 (Signal and information processing, modelling and simulation of physical phenomena) and offered by other academic departments (financial mathematics, biomedical engineering, economics and econometrics, statistics); 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.

.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 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. 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](#). 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's degree [120] in actuarial sciences (UCL)

Students who have taken at least 35 credits as part of the financial mathematics major have automatic access to the second year of the Master's degree programme [120] in actuarial sciences at UCL.

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

Students who have taken at least 35 credits as part of the Economics and econometrics major have automatic access to the second year of the Master's degree programme [120] in general economics at UCL (specialisation possible).

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

Students who have taken at least 25 credits as part of the Statistics major have automatic access to the second year of the Master's degree programme [120] in general statistics at UCL (specialisation possible).

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

-The Master's degree (120) in sciences and environmental management and the Master's degree (60) in sciences and environmental management (automatic admission with possible complementary coursework)

-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 <http://www.uclouvain.be/sites/socr/>).

Contacts

Attention, you are currently reading a page of an old programme study. To get up to date contact information, please got to the [current program study](#) site.

Curriculum Managment

Entite de la structure MAP

Acronyme	MAP
Dénomination	Commission de programme - Ingénieur civil en mathématiques appliquées
Adresse	Avenue Georges Lemaître, 4-6 bte L4.05.01 1348 Louvain-la-Neuve Tél 010 47 25 97 - Fax 010 47 21 80
Secteur	Secteur des sciences et technologies (SST)
Faculté	Ecole Polytechnique de Louvain (EPL)
Commission de programme	Commission de programme - Ingénieur civil en mathématiques appliquées (MAP)

Academic Supervisor : Pierre-Antoine ABSIL

Jury

Président du Jury : Jean-Didier LEGAT

Secrétaire du Jury : Raphaël JUNGERS

Usefull Contacts

Secrétariat : Nathalie PONET

Attention, you are currently reading a page of an old programme study. To get up to date contact information, please got to the [current program study](#) site.

