

**At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In English**Dissertation/Graduation Project : **YES** - Internship : **optional**Activities in English: **YES** - Activities in other languages : **optional**Activities on other sites : **optional**Main study domain : **Sciences de l'ingénieur et technologie**Organized by: **Louvain School of Engineering (EPL)**Programme acronym: **MECA2M** - Francophone Certification Framework: 7**Table of contents**

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## MECA2M - Introduction

### Introduction

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#### Introduction

This program trains students various fields of mechanical engineering: fluid mechanics, analytical and computational applied mechanics, the mechanics of materials and structures, applied dynamics, mechanical production, mechanical engineering design, mechanical manufacturing, and machines (thermal, thermodynamic, and energetic).

Through pedagogical laboratories, case studies, projects and a master's thesis, you will get hands-on experience, and you will become acquainted with the cutting edge methods used in relevant fields.

You will undertake numerous integrated projects, which will allow you to conceive, model, achieve and validate experimental systems, prototypes and devices.

#### Your profile

You

- Have solid skills in the field of mechanics due to your undergraduate studies
- Envisage a career in the industrial sector where you will play a role in design and research or in the organization and oversight of production;
- Wish to use your skills in the following fields: aeronautics, the spatial industry, energy, the metallurgical or plastics industry, the automotive industry, biomechanics, etc.;
- Seek a programme that will allow you to master scientific, technological and human problems that are linked to the field of mechanics.

#### Your future job

Mechanical engineers are present in all industrial sectors: the chemical industry, pharmaceutical and food industries, electronics and telecommunications industries, metallurgy, aeronautics, construction and engineering, large scale distribution, banking and consulting services, nanotechnologies and medical technologies, etc.

They play a role as researchers and developers, are responsible for production or management and hold jobs in marketing and sales (of advanced technological products).

We find civil engineers in departments of finance, information technology, training or quality control, the public sector, higher education, or in the Ministry of equipment and transportation. ([www.fabi.com](http://www.fabi.com))

#### Your programme

This Master's degree offers you:

- A versatile education in fields related to mechanical engineering;
- A vast choice of majors directly related to the latest research advances in the field;
- Pedagogy that links theory and practice: labs, projects, case studies, etc.;
- Advanced learning of numerical methods and their applications;
- The opportunity to undertake an internship in the industrial sector;
- The possibility of completing a portion of your coursework abroad (in Europe or elsewhere in the world)

## MECA2M - Teaching profile

### Learning outcomes

This diploma in civil engineering in mechanics aims to meet the challenges of designing and innovating, according to a polytechnical approach, complex solutions and systems linked to mechanics and its applications. This Master's degree aims to train experts in the area of mechanics and its applications and to do so in the context of the rapidly changing circumstances of Europe and the world.

The future civil engineer in mechanics will acquire the skills and knowledge to become a professional polytechnic engineer capable of integrating several disciplines in the areas of continuum mechanics, thermodynamics and machine design.

An individual capable of putting into practice his/her skills as well as the tools used in research and technology.

A specialist in extremely varied and specialized applied fields such as energetics, aerodynamics, automobiles, rail transport, robotics, numerical simulation, and scientific information.

A manager who can manage projects alone or in a team.

Polytechnic and multidisciplinary, the education offered by the Louvain School of Engineering privileges the acquisition of skills and knowledge that combine theory and practice and that deal with analysis, design, manufacturing, production, research and development and innovation while at the same time taking ethics and sustainable development into consideration.

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

1. Demonstrate a mastery of a solid body of knowledge in basic and engineering sciences, permitting him/her to understand and solve problems that are raised by mechanics.

1.1 Identify and apply concepts, laws, and practical reasoning to a given problem related to:

- Continuum mechanics
- Energy, thermodynamics and thermics
- Mathematical modelling and numerical simulation
- Project management
- Robotics, automated systems

1.2 Identify and use adequate modelling and calculation tools to solve these problems

1.3 Verify the plausibility and confirm the validity of results (orders of magnitude, units).

2. Organize and carry out an applied engineering procedure for the development of a product (and/or a service) that meets a need or solves a problem specific to the field of mechanics.

2.1 Analyse the problem or the operational needs that must be met, formulate the product specifications while taking technical and economic constraints into account.

2.2 Model the problem and design one or more technical solutions while integrating the mechanical aspects corresponding to the product specifications.

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

2.4 Implement and test a solution in the form of a mock up, a prototype and/or a numerical model.

2.5 Formulate recommendations to improve the operational characteristics of a proposed solution.

3. Organize and carry out a research project to understand a physical phenomenon or a new problem related to mechanics.

3.1 Document and summarize the existing knowledge in the field of mechanics.

3.2 Suggest a model and/or experimental device to simulate the performance of a system, thereby testing relevant hypotheses related to the phenomenon being studied.

3.3 Put together a summary report, which aims to explain the potentialities for theoretical and/or technical innovation resulting from the research project.

4. Contribute, as a member of a team, to the achievement of a multidisciplinary project while taking into account its objectives, allocated resources and constraints.

4.1 Create a project framework and explain the project objectives while taking into account the challenges and constraints that characterize the project's environment.

4.2 Collectively commit to a work schedule

4.3 Operate in a multidisciplinary environment with individuals who hold different points of view

4.4 Make team decisions when necessary to complete a project whether they pertain to technical solutions or to the division of labour.

5. Demonstrate effective communication skills (speaking and writing skills in French or in a foreign language) with the goal of successfully carrying out assigned projects.

5.1 Identify the client's needs: ask appropriate questions and listen to the entire request (not simply the technical aspects).

5.2 Present convincing arguments by using the language of your interlocutors (colleagues, technicians, clients, superiors).

5.3 Communicate through graphics and schemes (interpret a scheme, present a project, structure information).

5.4 Read, analyse, and use technical documents (standards, outlines, specifications).

5.5 Draft written documents that take contextual requirements and social conventions into account.

5.6 Give convincing oral presentations using appropriate communication techniques.

Display rigour, openness, and critical thinking. Be able to adopt the appropriate global point of view to validate the socio-technical relevance of a hypothesis or a solution, all the while drawing upon available technological and scientific innovations.

6.1 Apply standards and assure the robustness of a solution in the fields of mechanics and electricity.

6.2 Put solutions into perspective by including non-technical concerns (for example, in the area of energy and climate, take environmental and social angles into consideration).

6.3 Demonstrate critical thinking vis-à-vis technical solutions.

6.4 Evaluate one's own work

## Programme structure

Besides a core curriculum (33 credits) and a final specialization (30 credits), students complete their technical training by selecting courses (a minimum of 34 credits) among the following:

- Energy
- Aeronautics
- Dynamics, robotic and biomechanics
- Design, manufacturing and mechanics of materials
- Nuclear engineering

and the module of a multidisciplinary class of your choice.

In the spirit of openness, students can complete their program (a maximum of 20 credits) through multidisciplinary coursework. This includes an internship, completing a language programme, a choice of general knowledge classes or classes in human sciences. This is possible thanks to the flexibility that characterises this master's programme in civil and mechanical engineering. Based on their course choices, students will eventually select one or two majors.

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 UCLouvain as part of an exchange programme.

These types of programmes will be submitted for approval by the Programme Commission of the Master's degree in question.

## MECA2M Programme

## Detailed programme by subject

### CORE COURSES

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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

x



● LMECA2990	<b>GraduationProject/End of Studies Project</b> <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>		<span style="color: red;">[FR]</span> [q1+q2] [ ] [25 Credits] ⊕ <i>&gt; French-friendly</i>	
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Year

1 2

x

x x

<p>○ LMECA2840</p>	<p>Project in Mechanical Design II</p>	<p>Bruno Dehez Bruno Dehez (compensates) Renaud Ronsse Christophe Everarts (compensates) Benoît Raucourt Christophe Everarts (compensates) Renaud Ronsse</p>	<p>EN [q1+q2] [30h+30h] [6 Credits]  &gt; French-friendly</p>	<p>x</p>	<p></p>
<p>○ LEPL2020</p>	<p>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 qu'au plus tôt l'année où il.elle présente son travail de fin d'études.</i></p>	<p>Myriam Banaï Francesco Contino (coord.) Delphine Ducarme Jean-Pierre Raskin</p>	<p>EN [q1+q2] [30h+15h] [2 Credits]  &gt; French-friendly</p>	<p>x</p>	<p>x</p>

**PROFESSIONAL FOCUS [30.0]**

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🌐 Not open to incoming exchange students
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Click on the course title to see detailed informations (objectives, methods, evaluation...)

Year

1 2

**Content:**

○ LMECA2220	<a href="#">Internal combustion engines</a>	Francesco Contino Hervé Jeanmart	ES [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X
○ LMECA2322	<a href="#">Fluid mechanics II</a>	Philippe Chatelain Eric Deleersnijder Grégoire Winckelmans	ES [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X
○ LMECA2410	<a href="#">Mechanics of Materials</a>	Laurent Delannay Aude Simar	ES [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X
○ LMECA2755	<a href="#">Industrial automation</a>	Bruno Dehez Paul Fiset Renaud Ronsse	ES [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X
○ LMECA2854	<a href="#">Heat and mass transfer II</a>	Yann Bartosiewicz Matthieu Duponcheel	ES [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X
○ LMECA2801	<a href="#">Machine design</a>	Yorick Havelange (compensates Benoît Raucent) Benoît Raucent	ES [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X

**OPTIONS [54.0]**

Dans la rubrique "Options du master ingénieur civil en mécanique", l'étudiant-e qui choisit de valider une option doit sélectionner au minimum 20 crédits parmi les cours proposés. Il est possible de valider plusieurs 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 enjeux de l'entreprise.

#### Majors for the Master's degree in mechanical engineering

- > [Major in aeronautics](#) [ en-prog-2023-meca2m-lmeca222o ]
- > [Major in dynamics, robotic and biomechanics](#) [ en-prog-2023-meca2m-lmeca223o ]
- > [Major in energy](#) [ en-prog-2023-meca2m-lmeca224o ]
- > [Major in nuclear engineering](#) [ en-prog-2023-meca2m-lmeca231o ]
- > [Major in design, manufacturing and mechanics of materials](#) [ en-prog-2023-meca2m-lmeca226o ]
- > [Cours au choix disciplinaires](#) [ en-prog-2023-meca2m-lmeca237o ]

#### Options et cours au choix en connaissances socio-économiques

- > [Business risks and opportunities](#) [ en-prog-2023-meca2m-lmeca233o ]
- > [Major in Interdisciplinary Program in Entrepreneurship - INEO](#) [ en-prog-2023-meca2m-lmeca234o ]
- > [Cours au choix en connaissances socio-économiques](#) [ en-prog-2023-meca2m-lmeca200o ]

#### Other elective courses

- > [Other elective courses](#) [ en-prog-2023-meca2m-lmeca232o ]

**MAJORS FOR THE MASTER'S DEGREE IN MECHANICAL ENGINEERING****MAJOR IN AERONAUTICS**

Open to all students of civil and mechanical engineering and electromechanical engineering, classes in this major review mechanical applications of aeronautics: aeronautic structures, vibrations, aerodynamics, dynamics of flight, etc. The learning process consists of advanced classes in the mechanics of fluids and solids, with particular attention paid to numerical methods. This major is complemented by majors in Energy, Dynamics, Robotics and Biomechanics as well as Design, Manufacturing and Materials Mechanics (regarding problems of energy in aeronautics, motorisation, dynamics and the importance of materials in the design and maintenance of airplanes).

- Mandatory
- ✘ Optional
- △ Not offered in 2023-2024
- ⊕ Not offered in 2023-2024 but offered the following year
- ⊖ Offered in 2023-2024 but not the following year
- △ ⊖ Not offered in 2023-2024 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:**

✘ LGCIV2041	Numerical analysis of civil engineering structures	Hadrien Ratzet João Saraiva Esteves Pacheco De Alm	5.0 [q2] [20h+15h] [4 Credits] 🌐 > French-friendly	X	X
✘ LMECA2195	Gasdynamics and reacting flows	Miltiadis Papalexandris	5.0 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2300	Advanced Numerical Methods	Philippe Chatelain Christophe Craeye (coord.) Vincent Legat Jean-François Remacle	5.0 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2323	Aerodynamics of external flows	Philippe Chatelain Grégoire Winckelmans	5.0 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2550	Aircraft propulsion systems.	Philippe Chatelain	5.0 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2520	Calculation of planar structures	Issam Doghri	5.0 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2660	Numerical methods in fluid mechanics	Grégoire Winckelmans	5.0 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2830	Aerospace dynamics.	Philippe Chatelain	5.0 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
✘ LMECA2322	Fluid mechanics II	Philippe Chatelain Eric Deleersnijder Grégoire Winckelmans	5.0 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X

## MAJOR IN DYNAMICS, ROBOTIC AND BIOMECHANICS

Open to all students of civil and mechanical engineering and electromechanical engineering, classes in this major review dynamics, robotics as well as biomechanics. Whether it be an analysis of vibrations, adjustment of a robot or the design and production of components or micro-components in bioengineering (for example, artificial Implants, valves and prosthetics), this major allows students to address one or more applications from a mechanics perspective. This major is complemented by the majors in Aeronautics, Energy as well as Design, Manufacturing and Materials Mechanics especially for students interested in problems related to dynamics and robotics in aeronautics and energy. The design and the choice of materials is crucial whether it be for the adjustment of a robot or the selection of bio-materials in rehabilitation projects.

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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:

⊗ LGBIO2040	Biomechanics	Greet Kerckhofs	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LGCIV2042	Dynamics of structures	João Saraiva Esteves Pacheco De Alm	EN [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2170	Numerical Geometry	Vincent Legat Jean-François Remacle	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2215	Vehicle System Dynamics	Paul Fisetle	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2355	Mechanical design in biomedical engineering	Greet Kerckhofs Benoît Raucet Ann Vankrunkelsven (compensates Benoît Raucet)	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LELME2732	Robot modelling and control	Nicolas Docquier (compensates Renaud Ronsse)	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2802	Multibody system Dynamics	Paul Fisetle	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2875	System Identification	Gianluca Bianchin	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2335	Biorobotics	Renaud Ronsse	EN [q2] [30h+30h] [5 Credits] △ 🌐 > French-friendly	X	X



## MAJOR IN ENERGY

Classes in this major review the subject of energy in the real world. This subject is addressed in its entirety first by the study of production techniques and energy conversion (thermal machines, nuclear energy, renewable energy) followed by an analysis of the risks associated with energy production and the means of minimising these risks (major risks, pollution) and finally a study of energy consumption and its consequences. This major is complemented by the major in Aeronautics for those students interested in problems of energy and motorisation in aeronautics. This is also the case for the major in Dynamics, Robotics and Biomechanics as well as the major in Design, Manufacturing and Materials Mechanics for students interested in dynamics, automation, and materials used in the design and maintenance of systems of production and energy conversion.

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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 19 to 30credit(s)

Year

1 2

### Content:

⊗ LENVI2007	Renewable energy sources	Emmanuel De Jaeger Patrick Gerin (coord.) Hervé Jeanmart	🇧🇪 [q1] [45h+15h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LMECA2160	Combustion and fuels	Miltiadis Papalexandris	🇧🇪 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LELME2240	Energy systems lab.	Francesco Contino Hervé Jeanmart	🇧🇪 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LMECA2325	Biomass conversion	Patrick Gerin Hervé Jeanmart	🇧🇪 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LELME2420	Energetics.	Francesco Contino Hervé Jeanmart	🇧🇪 [q2] [30h+15h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LMECA2600	Introduction to nuclear engineering and reactor technology	Hamid Ait Abderrahim	🇧🇪 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LMECA2771	Thermodynamics of irreversible phenomena.	Miltiadis Papalexandris	🇧🇪 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LMECA2780	Introduction to Turbomachinery	Laurent Briceux Sergio Lavagnoli	🇧🇪 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LMECA2675	Robust Optimization of Energy Systems	Francesco Contino	🇧🇪 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X
⊗ LELME2150	Thermal cycles	Yann Bartosiewicz	🇧🇪 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly		X	X

## MAJOR IN NUCLEAR ENGINEERING

As with the Master's in civil electromechanical engineering with a specialization in energy as well as the Master's in civil and mechanical engineering, the goal of this major is to offer an in-depth education in the principal aspects of nuclear engineering. Entry into this programme, which is primarily overseen by the Mol Centre of Nuclear Energy, is conditional on an evaluation of candidates' skills based on the rules used for ERASMUS-SOCRATES exchange students. Further information about this major may be found on Mol's website SCK-CEN.

- Mandatory
- ✘ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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:

#### Compulsory courses for the nuclear engineering major (10 credits)

● LMECA2600	<a href="#">Introduction to nuclear engineering and reactor technology</a>	Hamid Ait Abderrahim	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	
● LMECA2648	<a href="#">Nuclear thermal-hydraulics (Centre d'étude nucléaire-Mol)</a>	Yann Bartosiewicz	EN [q1] [40h+7.5h] [5 Credits] 🌐 > French-friendly		X

#### Elective courses for the nuclear engineering major

✘ LBNE2002	<a href="#">Introduction to Nuclear Physics &amp; Measurements (Centre d'étude nucléaire-Mol)</a>		EN [q1] [] [3 Credits] 🌐		X
✘ LBNE2003	<a href="#">Safety of Nuclear Powerplants (Centre d'étude nucléaire-Mol)</a>		EN [q2] [] [5 Credits] 🌐		X
✘ LBNE2011	<a href="#">Radiation protection (Centre d'étude nucléaire-Mol)</a>		EN [q1] [] [3 Credits] 🌐	X	X

## MAJOR IN DESIGN, MANUFACTURING AND MECHANICS OF MATERIALS

Open to civil, mechanical and electromechanical engineering students, this major reviews design, manufacturing and the importance of materials in the development of a mechanical system. It also addresses physical and chemical properties and the behaviour of metals, polymers and composites. Next, the main techniques for shaping these materials (moulding by injection or compression, stretching, laminating, forging, extrusion, embossing) are studied from the thermo-mechanical and technological point of view. Finally, numerical modelling of these procedures is tackled with particular attention paid to welding techniques. All phases of the mechanical manufacturing process are studied from the design stage to the setting up of suitable manufacturing techniques to the production schedule and organisation of working groups. This major is rounded out by those in aeronautics and energy as well as dynamics, robotics and biomechanics for students interested in issues pertaining to design, manufacturing and the importance of materials be they in aeronautics, energy, transportation or bio-engineering.

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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

### Content:

⊗ LMAPR2483	Durability of materials	Laurent Delannay Thomas Pardoën	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2453	Advanced manufacturing technologies	Aude Simar	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2520	Calculation of planar structures	Issam Doghri	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2640	Mechanics of composite materials	Issam Doghri	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2860	Welding Science and Technology	Pascal Jacques Aude Simar	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2711	Quality management and control.	Nicolas Bronchart	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMAPR2020	Materials Selection	Pierre Bollen Bernard Nysten Thomas Pardoën	EN [q2] [30h+22.5h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMAPR2018	Rheology	Evelyne Van Ruymbeke	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X

- Mandatory
- ⊗ Optional
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- 🌐 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:

#### Comprehensive courses

⊗ LELEC1530	Basic analog and digital electronic circuits	Denis Flandre Jean-Didier Legat	[FR] [q1] [30h+30h] [5 Credits] 🌐	X	X
⊗ LELEC1370	Measurements and electrical circuits	Christophe Craeye Bruno Dehez Claude Oestges (coord.)	[FR] [q2] [30h+30h] [5 Credits] 🌐	X	X
⊗ LINMA1510	Linear Control	Gianluca Bianchin	[EN] [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA1451	Mechanical manufacturing.	Laurent Delannay Aude Simar	[FR] [q2] [30h+30h] [5 Credits] 🌐	X	X
⊗ LMECA2645	Major technological hazards in industrial activity.	Aude Simar	[FR] [q2] [30h] [3 Credits] 🌐	X	X

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

#### BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊙ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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:

● LEPL2211	Business issues introduction	Benoît Gailly	[EN] [q2] [30h] [3 Credits] 🌐 > French-friendly	X	X
● LEPL2212	Financial performance indicators	Anne-Catherine Provost	[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)

				Year	
				1	2
⌘ LEPL2210	Ethics and ICT	Maxime Lambrecht (compensates Axel Gosseseries) Maxime Lambrecht (compensates 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	EN [q2] [45h+20h] [6 Credits] 	x	x
⌘ MLSMM2136	Trends in Digital Marketing 	Ingrid Poncin	EN [q2] [30h] [5 Credits] 		x
⌘ MLSMM2134	e-Consumer Behavior 	Nicolas Kervyn (compensates Karine Charry)	EN [q2] [30h] [5 Credits] 		x

⌘ Cours en Sourcing and Procurement

⌘ LLSMS2036	Supply Chain Procurement	Per Joakim Agrell Antony Paulraj	EN [q1] [30h] [5 Credits] 	x	x
⌘ LLSMS2038	Procurement Organisation and Scope	Constantin Blome Canan Kocabasoglu Hillmer	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 INTERDISCIPLINARY PROGRAM IN ENTREPRENEURSHIP - INEO

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 entrepreneuriat (INEO) 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 INEO 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 <https://uclouvain.be/fr/etudier/ineo> (<https://uclouvain.be/fr/etudier/ineo>).

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 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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

○ LINEO2001	Théorie de l'entrepreneuriat	Frank Janssen	FR [q1] [30h+20h] [5 Credits] ⊕	X	
○ LINEO2002	Aspects juridiques, économiques et managériaux de la création d'entreprise	Yves De Cordt Marine Falize	FR [q1] [30h+15h] [5 Credits] ⊕	X	
○ LINEO2003	Plan d'affaires et étapes-clefs de la création d'entreprise <i>Les séances du cours LINEO2003 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	FR [q2] [30h+15h] [5 Credits] ⊕		X
○ LINEO2004	Séminaire d'approfondissement en entrepreneuriat	Frank Janssen	FR [q2] [30h+15h] [5 Credits] ⊕	X	

#### ⊗ Prerequisite courses

Student who have not taken management courses during their previous studies must enroll in LINEO2021.

○ LINEO2021	Financer son projet	Yves De Rongé Philippe Grégoire (compensates Yves De Rongé)	FR [q2] [30h+15h] [5 Credits] ⊕	X	
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## COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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:

⊗ 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
⊗ LMECA2711	Quality management and control.	Nicolas Bronchart	(FR) [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2645	Major technological hazards in industrial activity.	Aude Simar	(FR) [q2] [30h] [3 Credits] 🌐	X	X

## OTHER ELECTIVE COURSES

## OTHER ELECTIVE COURSES

- Mandatory
- ⊗ Optional
- △ Not offered in 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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.

### ⊗ 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)	Paula Lorente Fernandez (coord.)	(ES) [q1] [30h] [3 Credits] 🌐	X	X
⊗ LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	(ES) [q1] [30h] [5 Credits] 🌐	X	X
⊗ LNEER2500	Seminar of Entry to professional life in Dutch - Intermediate level	Isabelle Demeulenaere (coord.)	(NL) [q1 or q2] [30h] [3 Credits] 🌐	X	X

				Year	
				1	2
⊗ LNEER2600	Seminar of entry to professional life in Dutch - Upper-Intermediate level	Isabelle Demeulenaere (coord.) Dag Houdmont	⊗ [q1 or q2] [30h] [3 Credits]	x	x

⊗ **Group dynamics**

⊗ LEPL2351	Become a tutor	Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoën Benoît Raucent	⊗ [q1] [15h+30h] [3 Credits]	x	x
⊗ LEPL2352	Become a tutor	Jean-Charles Delvenne (coord.) Delphine Ducarme Thomas Pardoën Benoît Raucent	⊗ [q2] [15h+30h] [3 Credits]	x	x

⊗ **Autres UEs hors-EPL**

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



## Course prerequisites

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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>).

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### # 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

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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.

## MECA2M - 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
<b>UCLouvain Bachelors</b>			
<a href="#">Bachelor in Engineering</a>		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.
<b>Others Bachelors of the French speaking Community of Belgium</b>			
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.
<b>Bachelors of the Dutch speaking Community of Belgium</b>			
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.
<b>Foreign Bachelors</b>			
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 <a href="#">personalized access</a>
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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](#) (contact : [epl-admission@uclouvain.be](mailto:epl-admission@uclouvain.be)).

## Admission and Enrolment Procedures for general registration

## Teaching method

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### Methods that promote multidisciplinary studies

The Master's degree programme in civil and mechanical engineering is directly linked to the role played by mechanical civil engineers. They are at the centre of today's industries (such as robotics, transportation, energy production, micro medical devices, and space shuttles). Mechanical engineers must design diverse products like instruments, vehicles, and machines or even bigger systems. They must also design manufacturing procedures for these products. Finally, they play a leading role in the organisation, control, upkeep and maintenance of production systems. Versatility is necessary for working in sectors such as aeronautics, energy, metallurgy, petrochemistry, automobiles and biomechanics.

The educational programme for civil and mechanical engineering is thus by nature versatile. On the one hand, the field of mechanics is vast and is linked to the majority of other engineering fields most notably electricity, materials, chemistry, civil engineering, automation and modelling. On the other hand, students gain specialised skills in an engineering field while retaining solid scientific and technical credentials. This is due to the inclusive nature of engineering majors and the flexibility that characterises each student's course schedule. Furthermore, students have the option of taking courses in non-technical fields.

The research skills of the teaching team are extremely varied and range from advanced numerical simulation to aspects of energy to design techniques. Unquestionably UCL provides a wealth of education to its students. The Master's thesis (graduation project) is often the last multidisciplinary project. It is possible to choose one's advisor from among all the professors of the Louvain School of Engineering or to carry out the project at another institution such as the Von Karman Institute.

### Various teaching strategies

The pedagogical approach is the same as that of the Bachelor's degree programme in engineering sciences: active learning, an equal mix of team work and individual work, and emphasis on the development of non-technical skills. An important characteristic of the programme in mechanics is the immersion of students in their professors' research laboratories, which educate students through the questioning process inherent in research.

The programme prioritises projects, including a large scale project that puts groups of students in semi-professional situations. These projects promote students' critical thinking skills, which in turn allows them to design, model, realise and validate a prototype. Furthermore, in the Small and Medium Sized Business Creation major, students complete group projects as part of multidisciplinary teams throughout the duration of their Master's degree program.

In the last year of the programme, half of the time is devoted to the graduation project, which offers students the possibility of studying a given subject in-depth and provides an introduction to the actual working life of an engineer or researcher (thanks to the size of the project and the context within which it is carried out). This project is based on a theme related to one or several of the fundamental disciplines in mechanics at the Louvain School of Engineering or the Von Karman Institute. It may also be directly linked to a company. Finally, for students majoring in Small and Medium Sized Business Creation, the graduation project has a multidisciplinary design with the goal allowing groups of three students, ideally from different academic departments, to work on a business creation project.

### Diverse learning situations

Students will be confronted with various pedagogical tools adapted to different disciplines: lectures, projects, exercise sessions, problem solving sessions, case studies, experimental laboratories, internships in industry or research, group as well as individual work, and seminars. In certain areas, eLearning permits students to learn at their own pace and to carry out virtual experiments.

These diverse learning situations develop interdisciplinary skills as well as those that are non-technical. Thus, students acquire knowledge in a progressive manner all the while developing their independence, organisational and time management skills as well as their ability to communicate.

## Evaluation

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***The evaluation methods comply with the regulations concerning studies and exams (<https://uclouvain.be/fr/decouvrir/rgee.html>). More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading "Learning outcomes evaluation method".***

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").

Teaching activities are 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.

These diverse measures of evaluation allow for a complete assessment of the students' acquired skills. Written and oral exams are used to evaluate the knowledge acquired in Axis 1. Multiple choice questions (MCQ) may also be used to test knowledge but are less successful in testing students' ability to adapt to different situations. Thus MCQ are never used alone. Certain written exams begin with a new situation-problem and most of the questions refer to the different steps to solve this situation-problem. Thus the exam isn't a repetition or even a dissertation but an opportunity for students to use their skills to solve a new situation-problem. Thus students' skills are tested vis-à-vis the main steps in the engineering process (Axis 2). Axis 3 is mainly evaluated through seminars and the graduation project. Axes 4-6 are evaluated through various measures. For example, regarding Axis 5, written communication may be evaluated through written exams or report writing while oral communication may be evaluated by oral exams, a thesis defence, and oral presentations.

Certificate-based evaluation of learning for Axes 1 and 2 is mainly carried out through exams that take place at the end of the semester. The questions mostly have to do with the application of typical exercises. This testing is consistent with the students' acquired skills. The objectives of Axes 3-6 are most often obtained through the disciplinary mini-projects carried out in small groups. They are included in the teaching plan. When this is the case, the mini-project report is evaluated and the group mark contributes to the student's final mark. In certain instances, teaching is done through the Learning by Problem Solving method (Apprentissage par problèmes or APP); for example in the required course LMECA2801. In this case the APP group reports contribute to the student's final mark.

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

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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

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Further Master's degree programmes: [Advanced Master in Nuclear Engineering](#)

Further doctoral degree programmes: [GRAMECH](#) (GRAduate School in MECHanics)

UCLouvain Master's degrees (about 60) are accessible to UCLouvain Master's degree holders

For example:

- Different Master's degree programmes in management (automatic admission based on written application)
- The [Master \[60\] in Information and Communication](#) at Louvain-la-Neuve or the [Master \[60\] in Information and Communication](#) at Mons

## Contacts

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### Curriculum Management

Entity

Structure entity

Denomination

Faculty

Sector

Acronym

Postal address

SST/EPL/MECA

[\(MECA\)](#)

Louvain School of Engineering [\(EPL\)](#)

Sciences and Technology [\(SST\)](#)

MECA

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