

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In English

MECA2M - Introduction

Introduction

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)

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

				Year	
				1	2
○ LMECA2840	Project in Mechanical Design II	Bruno Dehez Bruno Dehez (compensates) Renaud Ronsse Christophe Everarts (compensates) Benoît Raucant Christophe Everarts (compensates) Renaud Ronsse	EN [q1+q2] [30h+30h] [6 Credits]  > French-friendly	x	
○ LEPL2020	Professional integration work <i>Les modules du cours LEPL2020 sont organisés sur les deux blocs annuels du master. Il est fortement recommandé à l'étudiant. e de les suivre dès le bloc annuel 1, mais il.elle ne pourra inscrire le cours qu'au plus tôt l'année où il.elle présente son travail de fin d'études.</i>	Myriam Banaï			

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
- [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:

○ LMECA2220	Internal combustion engines	Francesco Contino Hervé Jeanmart	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	
○ LMECA2322	Fluid mechanics II	Philippe Chatelain Eric Deleersnijder Grégoire Winckelmans	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	
○ LMECA2410	Mechanics of Materials	Laurent Delannay Aude Simar	EN [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	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

Content:

Course Code	Course Title	Instructor(s)	Details	Year 1	Year 2
⊗ LGBIO2040	Biomechanics	Greet Kerckhofs	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LGCIV2042	Dynamics of structures	João Saraiva Esteves Pacheco De Alm	FR [q1] [30h+15h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2170	Numerical Geometry	Vincent Legat Jean-François Remacle	FR [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2215	Vehicle System Dynamics	Paul Fiset	FR [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2355	Mechanical design in biomedical engineering	Greet Kerckhofs Benoît Raucant Ann Vankrunkelsven (compensates Benoît Raucant)	FR [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LELME2732	Robot modelling and control	Nicolas Docquier (compensates Renaud Ronsse)	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2802	Multibody system Dynamics	Paul Fiset	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LINMA2875	System Identification	Gianluca Bianchin	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2335	Biorobotics				

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

o Content:



- ⊙ 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:**

⊗ **Comprehensive courses**

⊗ LELEC1530	Basic analog and digital electronic circuits	Denis Flandre Jean-Didier Legat	
-------------	--	------------------------------------	--

				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

Content:

Required courses

● LINEO2001	Théorie de l'entrepreneuriat	Frank Janssen
-------------	------------------------------	---------------

⌘ LNEER2600	Seminar of entry to professional life in Dutch - Upper-Intermediate level	
-------------	---	--

Course prerequisites

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

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

Prerequisites and student's annual programme

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

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

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

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

Prerequisites list

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

- MGEST1108 - [Marketing](#)

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

- MGEST1108 - [Marketing](#)

The programme's courses and learning outcomes

For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies the skills expected of every graduate on completion of the programme. Course unit descriptions specify targeted learning outcomes, as well as the unit's contribution to reference framework of learning outcomes.

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
UCLouvain Bachelors			
Bachelor in Engineering		Direct access	Students who have neither major nor minor in the field of their civil engineering Master's degree may have an adapted master programme.
Others Bachelors of the French speaking Community of Belgium			
Bachelor in Engineering		Direct access	Students with a Bachelor's degree in engineering sciences who have not taken the equivalent of a minor in the field of their civil engineering master degree may have an adapted master programme.
Bachelors of the Dutch speaking Community of Belgium			

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

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
-----------------------	---------------

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).

Admission and Enrolment Procedures for general registration

