

**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: **ELME2M** - Francophone Certification Framework: 7

## Table of contents

[Introduction](#)

## ELME2M - Introduction

### Introduction

---

#### Introduction

## ELME2M - Teaching profile

### Learning outcomes

---

Integrating the fields of mechanics and electricity is one of the major challenges of the civil engineering student in electro-mechanics.

The Master's degree in Electro-mechanical engineering from UCLouvain favours multidisciplinary training and the ability to solve interface problems raised by the integration of several fields. It integrates the fields of electricity and mechanics into a coherent whole and prioritises basic knowledge with the aim of deepening or reorienting students' knowledge mid-career.

Students will acquire the knowledge and skills necessary to become:

- Specialists in mechatronics (electronics, mechanical production, automation and robotics) or specialists in energy (smart grids/energy networks, 8 0•

- 5.1. Identify the clients' needs: question, listen and ensure the understanding of all the dimensions of the request and not just the technical aspects.
- 5.2. Present your arguments and convince your interlocutors (technicians, colleagues, clients, superiors) by adopting their language.
- 5.3. Communicate through graphics and diagrams: interpret a diagram, present work results, structure information.
- 5.4. Read and analyse different technical documents related to the profession (standards, drawings, specifications).
- 5.5. Draft written documents that take into account contextual requirements and social conventions.
- 5.6. Use modern communication techniques to give convincing oral presentations.
6. Display rigour, openness, and critical thinking; validate the socio-technical relevance of a hypothesis or a solution, all the while drawing upon available technological and scientific innovations. (Axis 6)
- 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 factors into consideration).
- 6.3. Demonstrate critical thinking vis-à-vis technical solutions or methodological approach regarding the involved actors.
- 6.4. Evaluate one's own work.

## Programme structure

---

The student's programme includes:

- A common core curriculum (57 credits)
- A final specialisation (30 credits)
- One of more of the major courses or elective courses listed below.

The graduation project is normally completed in the second year. However, students may, depending on the nature of their project, choose to take their classes in the first or second year so long as their course prerequisites allow it. This is particularly the case for students completing part of their program abroad.

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 requested for the approval of their diploma as well as for the approval of their major (in order to include their academic distinctions in the diploma supplement).

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

## ELME2M 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

○ LELME2990	<b>Graduation project/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>		EN [q1+q2] [ ] [25 Credits]  > French-friendly			X
○ LEPL2020	<b>Professional integration work</b> <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 Francesco Contino (coord.) Delphine Ducarme Jean-Pierre Raskin	EN [q1+q2] [30h+15h] [2 Credits]  > French-friendly	X		X
○ LINMA1510	<b>Linear Control</b>	Gianluca Bianchin	EN [q1] [30h+30h] [5 Credits]  > French-friendly	X		X

### o Electricity and electronics courses

○ LELEC2660	<b>Power electronics</b>	Marc Bekemans	EN [q2] [30h+15h] [5 Credits]  > French-friendly	X		X
○ LELEC2811	<b>Instrumentation and sensors</b>	David Bol Laurent Francis	EN [q1] [30h+30h] [5 Credits]  > French-friendly	X		X
○ LELME2313	<b>Dynamic modelling and control of electromechanical converters</b>	Emmanuel De Jaeger Bruno Dehez	EN [q1] [30h+30h] [5 Credits]  > French-friendly	X		X

### o Project

○ LELME2002	<b>Project in mechatronics</b>	Bruno Dehez Bruno Dehez (compensates) Renaud Ronsse	EN [q1+q2] [30h+45h] [10 Credits]  > French-friendly	X		X
-------------	--------------------------------	---	--	---	--	---

**PROFESSIONAL FOCUS : MECATRONICS [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:**

Pour LINFO1361, une alternative peut être proposée pour les non-speaking French students (as Machine Learning course).

○ LELME2311	<a href="#">Physics of Electromechanical Converters</a>	Bruno Dehez	20 [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
○ LELEC2531	<a href="#">Electronic digital systems</a>	Jean-Didier Legat	20 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
○ LMECA2755	<a href="#">Industrial automation</a>	Bruno Dehez Paul Fiset Renaud Ronsse	20 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
○ LMECA2801	<a href="#">Machine design</a>	Yorick Havelange (compensates Benoît Raucent) Benoît Raucent	20 [q1] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
○ LINFO1361	<a href="#">Artificial intelligence</a>	Eric Piette (compensates Yves Deville)			

## OPTIONS DU MASTER INGÉNIEUR CIVIL ÉLECTROMÉCANICIEN

---

### MAJOR IN CIRCUITS AND ELECTRONIC SYSTEMS

---

The goal of this major (which it shares with Master's degree programs in electricity and electro-mechanics) is to introduce students to system design techniques, computer aided simulation, manufacturing and experimental characterisation of components and circuits (both analogue and numerical) as well as mixed systems. Emphasis is placed on practical applications and the completion of 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 \(objectives, methods, evaluation...\)](#)

*The student may select 15 to 30 credits from the following courses:*

*From 15 to 30 credit(s)*

Year

1 2

### o Content:

---

## MAJOR IN SYSTEMS AND CONTROL 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, ...)
-



				Year	
				1	2
⊗ LGCIV2042	Dynamics of structures	João Saraiva Esteves Pacheco De Alm	[q1] [30h+15h] [5 Credits]  > French-friendly	x	x
⊗ LMECA2170	Numerical Geometry	Vincent Legat			

## MAJOR IN DESIGN, MANUFACTURING AND MECHANICS OF MATERIALS

---

- 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]

---

## 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 contingent 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 \(objectives, methods, evaluation...\)](#)

*Commune aux masters ingénieur civil électromécanicien, finalité spécialisée énergie, et ingénieur civil mécanicien, cette option a pour objectif d'offrir une formation approfondie dans les principaux aspects du génie nucléaire. L'accès à cette option qui est organisée pour sa plus grande partie au Centre d'énergie nucléaire de Mol est conditionnée à une évaluation des compétences des candidats suivant les règles utilisées pour les candidatures aux échanges ERASMUS-SOCRATES. Plus de détails sur cette option sont disponibles sur le site du SCK-CEN de Mol.*

From 16 to 21credit(s)

Year

**MAJOR IN AERONAUTICS**

[q2] [30h+30h] [5 Crd] (Craeye (coord.) 99 10.106 1 0 0 -1 17.4599 10.106egat) TJ 1 0+30h] [5 Crd] Jean-François +30h] [5 Crd] 9992 44.101.39190.381012 m 480.889008 290.3269.3659

Ouverte aux étudiant-es ingénieurs civils mécaniciens et électromécaniciens, cette option reprend des cours sur l'application de la mécanique à l'aéronautique : structures aéronautiques, vibrations, aérodynamique, dynamique du vol. Cet apprentissage se fait au travers de cours approfondis de mécanique des fluides et des solides, avec une attention particulière portée aux méthodes numériques.

- 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 30 credit(s)

Year

1 2

o **Content:**

⊗ LGCIV2041	Numerical analysis of civil engineering structures	Hadrien Rattez João Saraiva Esteves Pacheco De Alm	FR [q2] [20h+15h] [4 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2195	Gasdynamics and reacting flows	Miltiadis Papalexandris	FR [q2] [30h+30h] [5 Credits] 🌐 > French-friendly	X	X
⊗ LMECA2300	Advanced Numerical Methods	Philippe Chatelain Christophe Craeye (coord.) Vincent Legat Jean-François Remacle			



OPTIONS ET COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

**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

o **Content:**

o LEPL2211



## **COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES**

● Mandatory

✘ Optional

△

---



**OTHERS ELECTIVE COURSES**

---

**OTHERS 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...)

## 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 de005meering



Bachelor in Engineering	For others institutions	Access based on application	degree may have an adapted master programme. See <a href="#">Personalized access</a>
-------------------------	-------------------------	-----------------------------	---

## 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

Masters in engineering	Direct access
------------------------	---------------

## Holders of a non-University 2nd cycle degree

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

## 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: [www.uclouvain.be/en/study/inscriptions/futurs-etudiants.html](http://www.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

---

The majority of classes consist of lectures and tutorials. The tutors are upper-class students who have specialised tutor training (the class LEPL2351). This class provides its participants with practical tutoring techniques to help fellow students.

### **Methods that promote multidisciplinary studies**

UCLouvain's Master's degree programme in electro-mechanics is by nature multidisciplinary because it combines classes in electricity, mechanics, automation and computer sciences. It also includes non-engineering elective classes such as economics, management and languages.

### **Various teaching strategies**

Through a pedagogy that prioritises projects that integrate several subjects, students gain critical thinking skills, which in turn allows them to design, model, and create electro-mechanic prototypes and systems.

## Possible trainings at the end of the programme

---

### Specialised Master's Degrees

- [Advanced Master in Nanotechnologies](#)
- [Advanced Master in Nuclear Engineering](#)
- Specialised Master's Degree in Biotechnology and Applied Biology

### Doctoral Programmes

Most doctoral students study at the Institute of Information and Communication Technologies, Electronics and Applied Mathematics as well as the Institute of Mechanics, Materials and Civil Engineering. The faculty of these Institutes participate in numerous doctoral

