NRGY2M -

NRGY2M - Teaching profile

Learning outcomes

ntegrating 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).
- Individuals with field experience capable of putting into practice their knowledge of research and technology.
- Managers in charge of projects involving teams.

The Master's degree programme in electro-mechanical engineering prepares its students to be aware of technical progress and adapt to the needs of the job market and changes in business.

Polytechnic and multidisciplinary, the training provided by the Louvain School of Engineering privileges the acquisition of knowledge that combines theory and practice and that is open to analysis, design, manufacturing, production, research and development and innovation all the while paying attention to ethics and sustainable development.

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

1.Demonstrate mastery of a solid body of knowledge in basic science and engineering science allowing the student to learn and solve problems pertaining to electro-mechanics. (Axis 1)

1.1. Identify and use concepts, laws and appropriate reasoning from a variety of fields in mechanics and electricity to solve a given problem:
• Electricity (in the broad sense)
• Electrotechnics (conversion, controls, actuation)
• Electronics (digital electronics, instrumentation, sensors)
• Automation
• Computer sciences (real time)
• Mechanics (modeling, design)
• Robotics and automation.
1. 2. Identify and use modelling and calculation tools to solve problems associated with the aforementioned fields.
1. 3. Verify problem solving results especially with regard to orders of magnitude and/or units (in which the results are expressed).

2.Organize and carry out an applied engineering process to develop a product and/or service responding to a particular need or problem in the field of electro-mechanics. (Axis 2)

2.1. Analyse a problem, take stock of features and constraints, and formulate specifications in a field where the technical and economic limits are taken into account
2.2. Model a problem and design one or more technical solutions (drawing on the fields of mechanics, electrics, electronics, electrotechnics
or information technology) and respond to problem specifications.

5.Communicate effectively (speaking or writing in French or a foreign language) with the goal of carrying out assigned projects. (Axis 5)

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. Be rigourous, open-minded and critical: 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 (52 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.

NRGY2M Programme

Detailed programme by subject

CORE COURSES

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 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
LINMA1510	Linear Control	Gianluca Bianchin	[FR] [q1] [30h+30h] [5 Credits] *> French-friendly*	x	x

PROFESSIONAL FOCUS [30.0]

LIST OF ELECTIVES

				Year 1	2
LMECA2195	Gasdynamics and reacting flows	Miltiadis Papalexandris	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
LMECA2300	Advanced Numerical Methods	Philippe Chatelain Christophe Craeye (coord.) Vincent Legat Jean-François Remacle	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
LMECA2322	Fluid mechanics II	Philippe Chatelain Eric Deleersnijder Grégoire Winckelmans	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
LMECA2323	Aerodynamics of external flows	Philippe Chatelain Grégoire Winckelmans	EN [q2] [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
LMECA2550	Aircraft propulsion systems.	Philippe Chatelain	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
LMECA2660	Numerical methods in fluid mechanics	Grégoire Winckelmans	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
LMECA2830	Aerospace dynamics.	Philippe Chatelain	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x

MAJOR IN NUCLEAR ENGINEERING

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students

[FR]

				Year 1	2
⊠ LMECA2780	Introduction to Turbomachinery	Laurent Bricteux Sergio Lavagnoli	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LMECA2801	Machine design	Yorick Havelange (compensates Benoît Raucent) Benoît Raucent	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LMECA2802	Multibody system Dynamics	Paul Fisette	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LELME2311	Physics of Electromechanical Converters	Bruno Dehez	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LELEC2330	Opto-electronic and power devices	Denis Flandre Laurent Francis (coord.)	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LELEC2595	Electrical power systems dynamics and quality of supply	Emmanuel De Jaeger	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LELEC2753	Electrical power systems: advanced topics and smart grids	Emmanuel De Jaeger	EN [q2] [30h+15h] [5 Credits] > *French-friendly*	x	x
⊠ LELEC2870	Machine learning : regression, deep networks and dimensionality reduction	John Lee John Lee (compensates Michel Verleysen)	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LGCIV2052	Hydropower plants	Sandra Soares Frazao	EN [q2] [20h] [3 Credits] > *French-friendly*	x	x
⊠ LMAPR1492	Materials physics	Jean-Christophe Charlier Xavier Gonze Luc Piraux Gian-Marco Rignanese	FR [q2] [37.5h+22.5h] [5 Credits]	x	x
⊠ LMAPR2014	Physics of Functional Materials	Xavier Gonze Luc Piraux Samuel Poncé Gian-Marco Rignanese	EN [q1] [37.5h+22.5h] [5 Credits] > *French-friendly*	x	x
⊠ LMAPR2471	Transport phenomena in solids and nanostructures	Jean-Christophe Charlier Luc Piraux	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
⊠ LMECA2220	Internal combustion engines	Hervé Jeanmart Maxime Pochet (compensates Francesco Contino)	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x

OPTIONS ET COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

Law, Regulation and Legal Context

BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 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...)

Content:

				Year 1	Year 2
LEPL2211	Business issues introduction	Vincent Cassiers Werner Derycke 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 5credit(s)

One course between

COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

- Mandatory
- Optional
- Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- Offered in 2024-2025 but not the following year
- Not offered in 2024-2025 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:

OTHERS ELECTIVE COURSES

OTHERS ELECTIVE COURSES

- Mandatory

Course prerequisites

There are no prerequisites between course units (CUs) for this programme, i.e. the programme activity (course unit, CU) whose learning outcomes are to be certified and the corresponding credits awarded by the jury before registration in another CU.

The programme's courses and learning outcomes

For each UCLouvain training programme, a reference framework of learning outcomes specifies the 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.

NRGY2M - 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

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 enginering master degree may have an adapted master programme.
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in engineering		Access with additional training	Students who have no specialisation in the field of their civil engenering master degree may have an adapted master programme with up to 60 additional credits.
Foreign Bachelors			
Bachelor in engineering	.chel [(degrty Clu master)] TJ 1 0 0 1 10.444 400024 TmIn 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 enginering master degree may have an adapted master programme.

Bachelor in Engineering	For others institutions	Access based on application	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	
Masters in engineering	Direct access

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.

Selection criteria are summarized here (contact : epl-admission@uclouvain.be).

Admission and Enrolment Procedures for general registration

In addition to exchange programmes under the Erasmus+ programme, numerous agreements have been established with a wide range of universities through various partner networks such as:

- TIME network (Top Industrial Managers in Europe).

- CLUSTER network

- Magalhães network

- Circle U. network through several networks and European University Alliance

So, there's no shortage of opportunities to gain an additional qualification and/or spend part of the year abroad during your two-year Master's degree! It's the perfect opportunity to discover or improve your knowledge of a foreign language, tackle subjects from a new angle and gain unique experience in Europe or the rest of the world.

If you would like more information, please visit the dedicated pages of the EPL International Office to discover all the destinations, testimonials from former students and all the procedures to follow to make these opportunities a success.

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 programmes. A comprehensive list is available from the President of the Third Cycle Commission.

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

For example:

- The Master [120] in Environmental Science and Management (automatic admission with possible complementary coursework)
- 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

Curriculum Management

Entity

Structure entity	SST/EPL/ELME
Denomination	(ELME)
Faculty	Louvain School of Engineering (EPL)
Sector	Sciences and Technology (SST)
Acronym	ELME
Postal address	Place du Levant 3 - bte L5.03.02 1348 Louvain-la-Neuve

Academic supervisor: Emmanuel De Jaeger

Useful Contact(s)

- Président du jury: Claude Oestges
- Secrétaire du jury: Bruno Dehez
- Secrétariat: Isabelle Dargent