ELME2M
2017 - 2018
Master [120] in Electro-mechanical Engineering

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In english
Dissertation/Graduation Project: YES - Internship: optional
Activities in other languages: YES
Activities on other sites: optional
Main study domain: Sciences de l'ingénieur et technologie
Organized by: Ecole Polytechnique de Louvain (EPL)
Programme code: elme2m - Francophone Certification Framework: 7

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Introduction

The Master’s degree programme in electro-mechanical engineering draws equally from two fields (mechanics and electricity) and prioritises basic knowledge with the goal of deepening or reorienting students’ knowledge mid-career.

By the end of the programme, students will be able to keep up with technical developments and adapt themselves to the needs of the job market.

Your profile

You

• Have solid knowledge of electricity and mechanics;
• Want to improve your understanding of current technological and scientific issues;
• Want to design, model, realise and validate experimental devices and systems;
• Want to specialise in mechatronics or in energy and foresee a career in robotics and “flexible production”, energy transformation and management, vehicles and transportation systems and/or aeronautics.

Your programme

This Master’s degree offers:

• General knowledge of electro-mechanics based on research;
• The mastery of mathematical and physical methods used in electricity and mechanics;
• An interdisciplinary approach to problem solving with particular emphasis placed on interface problems;
• Pedagogy centred on project-based learning;
• The possibility of testing your knowledge in the job market thanks to internships in the industrial sector.

Majors: Mechatronics; Energy
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 UCL 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, thermodynamics and energy).
- Individuals with field experience capable of putting into practice their knowledge of research and technology.
- Managers who can manage team projects

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)

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)

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### 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. 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)
   - Electrical energy (transport, quality, management)
   - Electro-technics (conversion, controls, activation)
   - Electronics (digital electronics, instrumentation)
   - Automation
   - Computer sciences (real time)
   - Mechanics (modeling, design)
   - Thermodynamics and thermics
   - Fluid dynamics
   - Robotics and automation.

2. Identify and use modelling and calculation tools to solve problems associated with the aforementioned fields.

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)

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. Model a problem and design one or more technical solutions (drawing on the fields of mechanics, electrics, electronics or information technology) and respond to problem specifications.
3. Evaluate and classify solutions with regards to all the specification criteria: efficiency, feasibility, ergonomic quality and environmental security (for example: too expensive, too complex, too dangerous, too difficult to manipulate).
4. Test a solution using a mock up, a prototype or a numerical model.
5. Formulate recommendations to improve a technical solution.
3. Organise and carry out a research project to learn about a physical phenomenon or a new problem relating to the field of electro-mechanics. (Axis 3)

1. Document and summarise the existing body of knowledge in the field of mechanics and electricity.
2. Suggest an experimental model or device (for example in the area of thermal regulation) by first constructing a mathematical model, then by using laboratories to create a device simulates system behaviour and tests relevant hypotheses.
3. Synthesise conclusions in a report that shows the key parameters and their influence on the behaviour of the phenomenon under study (choice of forms and materials, physio-chemical environment, conditions for use).

4. Contribute, through teamwork, to a multidisciplinary project and carry out the project while taking into account its objectives, resources, and constraints. (Axis 4)

1. Frame and explain the project’s objectives taking into account the issues and constraints that characterise the project’s environment.
2. Collaborate with peers on a multidisciplinary topic (mechanics and electricity) to create a work schedule (and resolve any resulting conflicts).
3. Make team decisions to successfully complete the project whether they be about technical solutions of the division of labour.

5. Communicate effectively (speaking or writing in French or a foreign language) with the goal of carrying out assigned projects. (Axis 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.
2. Present your arguments and convince your interlocutors (technicians, colleagues, clients, superiors) by adopting their language.
3. Communicate through graphics and diagrams: interpret a diagram, present work results, structure information.
4. Read and analyse different technical documents related to the profession (standards, drawings, specifications).
5. Draft written documents that take into account contextual requirements and social conventions.
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)

1. Apply standards and assure the robustness of a solution in the fields of mechanics and electricity.
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).
3. Demonstrate critical thinking vis-à-vis technical solutions.
4. Evaluate one’s own work.

Programme structure

The student’s programme includes:

- A common core curriculum (30 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.

For a programme-type, and regardless of the focus, options/or elective courses selected, this master will carry a minimum of 120 credits divided over two annual units, corresponding to 60 credits each.
### ELME2M Detailed programme

#### Programme by subject

**CORE COURSES [54.0]**

- **Mandatory**
- **Optional**
- △ Courses not taught during 2017-2018
- ☼ Periodic courses not taught during 2017-2018
- ⌂ Periodic courses taught during 2017-2018
- Activity with requisites

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Activity</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LELME2990</td>
<td>Graduation project/End of studies project</td>
<td>Yann Bartosiewicz (coord.)</td>
<td>28 Credits</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>LELEC2311</td>
<td>Physics of Electromechanical Converters</td>
<td>Bruno Dehez</td>
<td>4 Credits</td>
<td>2q</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>LELEC2660</td>
<td>Power electronics</td>
<td>Marc Bekemans</td>
<td>4 Credits</td>
<td>1q</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>LELEC2811</td>
<td>Instrumentation and sensors</td>
<td>David Bol, Laurent Francis</td>
<td>5 Credits</td>
<td>1q</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

#### Options courses

- **Options**
- > Major in circuits and electronic systems
- > Major in MEMS & NEMS
- > Major in automation and dynamic systems
- > Major in nuclear engineering
- > Major in aeronautics
- > Major in design, manufacturing and mechanics of materials
- > Major in business creation and management
- > Major in business risks and opportunities
- > Major in small and medium sized business creation
- > Elective courses
- > Cours au choix : Compétences transversales et contact avec l'entreprise

#### Mechanical courses

- **LMECA2755**
  - Industrial automation
  - Bruno Dehez
  - Paul Fisette
  - Renaud Ronsse
  - 30h+30h
  - 5 Credits
  - 1q

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

For students who did their bachelor at UCL
The student shall select
### Questions of religious sciences: Biblical readings
- **LTECO2100**
- Title: Questions of religious sciences: Biblical readings
- Instructor: Hans Ausloos
- Credits: 2
- Weekly: 15h
- Type: 1q

### Questions of religious sciences: reflections about Christian faith
- **LTECO2200**
- Title: Questions of religious sciences: reflections about Christian faith
- Instructor: Dominique Martens
- Credits: 2
- Weekly: 15h
- Type: 2q

### Questions of religious sciences: questions about ethics
- **LTECO2300**
- Title: Questions of religious sciences: questions about ethics
- Instructor: Marcela Lobo Bustamante
- Credits: 2
- Weekly: 15h
- Type: 1q

### Project (6 credits)

#### Project in mechatronics
- **LELME2002**
- Title: Project in mechatronics
- Instructor: Bruno Dehez, Renaud Ronsse
- Weekly: 30h+30h
- Credits: 6
- Type: 1+2q

#### Project in energy
- **LELME2003**
- Title: Project in energy
- Instructor: Yann Bartosiewicz, Emmanuel De Jaeger, Hervé Jeanmart
- Weekly: 30h+30h
- Credits: 6
- Type: 1+2q

### Transversal skills and professional contacts

If the student takes the internship LFSA2995 the maximum authorized credits are 26
De 3 à 21 credits parmi
## LIST OF FOCUSES

- **Professional focus: Mecatronics**
  - [en-prog-2017-elme2m-lelme220s]
- **Professional focus: Energy**
  - [en-prog-2017-elme2m-lelme221s]

### PROFESSIONAL FOCUS: MECATRONICS [30.0]

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses not taught during 2017-2018</td>
<td>Periodic courses not taught during 2017-2018</td>
</tr>
</tbody>
</table>

#### Year 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LELEC2103</td>
<td>Project in Electricity 3: Electronic systems</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2732</td>
<td>Introduction to robotics</td>
<td>5</td>
<td>1q</td>
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</table>

#### Year 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LELEC2313</td>
<td>Dynamic modelling and control of electromechanical converters</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LELEC2531</td>
<td>Design and Architecture of digital electronic systems</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2801</td>
<td>Machine design</td>
<td>5</td>
<td>1q</td>
</tr>
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</table>

#### Activity with requisites

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

### PROFESSIONAL FOCUS: ENERGY [30.0]

<table>
<thead>
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<th>Mandatory</th>
<th>Optional</th>
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<tbody>
<tr>
<td>Courses not taught during 2017-2018</td>
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</tbody>
</table>

#### Year 1

<table>
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<tr>
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<th>Course Title</th>
<th>Credits</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMECA2150</td>
<td>Thermal cycles</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2160</td>
<td>Combustion and fuels</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2220</td>
<td>Internal combustion engines</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2322</td>
<td>Fluid mechanics and transfer II</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LELEC2520</td>
<td>Electric Power Systems</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LELEC2595</td>
<td>Electric Power Systems Quality</td>
<td>5</td>
<td>1q</td>
</tr>
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#### Year 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>LMECA2160</td>
<td>Combustion and fuels</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>LMECA2220</td>
<td>Internal combustion engines</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>LMECA2322</td>
<td>Fluid mechanics and transfer II</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>LELEC2520</td>
<td>Electric Power Systems</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LELEC2595</td>
<td>Electric Power Systems Quality</td>
<td>5</td>
<td>1q</td>
</tr>
</tbody>
</table>

#### Activity with requisites

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

### OPTIONS

Students complete their programme through a combination of major course work and elective classes for a minimum total of 120 credits.
Major in business creation and management

> Major in circuits and electronic systems [en-prog-2017-elme2m-lelme227o]
> Major in MEMS & NEMS [en-prog-2017-elme2m-lelme229o]
> Major in automation and dynamic systems [en-prog-2017-elme2m-lelme230o]
> Major in dynamic, robotics and biomechanics [en-prog-2017-elme2m-lelme233o]
> Major in nuclear engineering [en-prog-2017-elme2m-lelme237o]
> Major in aeronautics [en-prog-2017-elme2m-lelme240o]
> Major in design, manufacturing and mechanics of materials [en-prog-2017-elme2m-lelme241o]

Elective courses

> Cours au choix : Compétences transversales et contact avec l'entreprise [en-prog-2017-elme2m-lelme953o]

OPTIONS

Students may select one of the majors suggested by the Master's degree programme in electrical or mechanical engineering provided that the courses in question are not already part of their course schedule. The following majors are highly recommended.

**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.

The student may select 15 to 30 credits from the following courses:
**De 15 à 29 credits parmi**

### Compulsory course in electronic circuits and systems

- **LELEC2532** Design and Architecture of analog electronic systems
  - David Bol
  - Denis Flandre
  - 30h+30h
  - 5 Credits
  - 2q

### Elective courses in electronic circuits and systems

- **LELEC2541** Advanced Transistors
  - Vincent Bayot (coord.)
  - Denis Flandre
  - Jean-Pierre Raskin
  - 30h+30h
  - 5 Credits
  - 2q

- **LELEC2570** Synthesis of digital integrated circuits
  - David Bol
  - 30h+30h
  - 5 Credits
  - 1q

- **LELEC2580** Design of RF and microwave communication circuits
  - Christophe Craeye
  - Danielle Janvier
  - 30h+30h
  - 5 Credits
  - 2q

- **LELEC2590** Seminars in electronics and communications
  - Denis Flandre
  - Isabelle Huynen
  - Jérôme Louveaux
  - 30h
  - 3 Credits
  - 2q

- **LELEC2620** Modeling and implementation of analog and mixed analog/digital circuits and systems on chip
  - David Bol
  - 30h+30h
  - 5 Credits
  - 2q

- **LELEC2650** Synthesis of analog integrated circuits
  - Denis Flandre
  - 30h+30h
  - 5 Credits
  - 1q

- **LELEC2660** Power electronics
  - Marc Bekemans
  - 30h+15h
  - 4 Credits
  - 1q
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LELEC2700</td>
<td>Microwaves</td>
<td>Isabelle Huynen, Danielle Janvier (compensates Isabelle Huynen)</td>
<td>30h+30h</td>
<td>5</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LELEC2760</td>
<td>Secure electronic circuits and systems</td>
<td>François-Xavier Standaert</td>
<td>30h+30h</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>LELEC2811</td>
<td>Instrumentation and sensors</td>
<td>David Bol, Laurent Francis</td>
<td>30h+30h</td>
<td>5</td>
</tr>
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<tr>
<td>LGBIO2020</td>
<td>Bioinstrumentation</td>
<td>André Mouraux, Michel Verleysen</td>
<td>30h+30h</td>
<td>5</td>
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</tr>
</tbody>
</table>
MAJOR IN MEMS & NEMS

As with other Master’s degree programmes in electrical or mechanical engineering, the major in micro and nanosystems seeks to introduce students to micro and nano manufacturing and design techniques, multi-physical simulation and the characterisation of micro and nano receptors and actuators in integrated technology. Given the applications of MEMS and NEMS in numerous sectors (automobile, telecommunications, electronics, households, medicine), the analysis of micro and nanostructures and the study of their behaviour is based on a multidisciplinary approach.

The student may select 15 to 28 credits from the following courses:
De 15 à 28 credits parmi

### Compulsory courses in MEMS & NEMS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Lecturers</th>
<th>Credits</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LELEC2560</td>
<td>Micro and Nanofabrication Techniques</td>
<td>Laurent Francis, Benoit Hackens, Jean-Pierre Raskin</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LELEC2895</td>
<td>Design of micro and nanosystems</td>
<td>Denis Flandre, Laurent Francis (coord.), Thomas Pardoen, Jean-Pierre Raskin</td>
<td>5</td>
<td>1q</td>
</tr>
</tbody>
</table>

### Elective courses in MEMS & NEMS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Lecturers</th>
<th>Credits</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td>LELEC2590</td>
<td>Seminars in electronics and communications</td>
<td>Denis Flandre, Isabelle Huynen, Jérôme Louveaux</td>
<td>3</td>
<td>2q</td>
</tr>
<tr>
<td>LMAPR2015</td>
<td>Physics of Nanostructures</td>
<td>Jean-Christophe Charlier, Xavier Gonze, Aurélien Lherbier (compensates Xavier Gonze), Aurélien Lherbier (compensates Jean-Christophe Charlier), Luc Piraux</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMAPR2020</td>
<td>Materials Selection</td>
<td>Christian Bailly, Thomas Pardoen</td>
<td>5</td>
<td>2q</td>
</tr>
<tr>
<td>LPHY2246</td>
<td>Vacuum physics and techniques</td>
<td>Benoit Hackens, Sorin Melinte</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LELEC2811</td>
<td>Instrumentation and sensors</td>
<td>David Bol, Laurent Francis</td>
<td>5</td>
<td>1q</td>
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</table>
# MAJOR IN AUTOMATION AND DYNAMIC SYSTEMS

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Periodicity</th>
<th>Requisites</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>LGBIO2060</td>
<td>Modelling of biological systems</td>
<td>Philippe Lefèvre</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>1</td>
<td>LINMA2000</td>
<td>Analysis and control of distributed parameter systems</td>
<td>Denis Dochain</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>1</td>
<td>LINMA2361</td>
<td>Nonlinear dynamical systems</td>
<td>Pierre-Antoine Absil</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>1</td>
<td>LINMA2671</td>
<td>Advanced control and applications</td>
<td>Julien Hendrickx</td>
<td>5</td>
<td>1q</td>
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<tr>
<td>1</td>
<td>LINMA2510</td>
<td>Mathematical ecology</td>
<td>Eric Deleersnijder (coord.)</td>
<td>5</td>
<td>2q + 22.5h</td>
<td></td>
</tr>
</tbody>
</table>

The student may select:

De 15 à 30 credits parmi

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# MAJOR IN DYNAMICS, ROBOTICS AND BIOMECHANICS

The goal of this major (which it shares with Master’s degree programs in electricity and electro-mechanics) is to give students a complete education in this field. All phases of the mechanical manufacturing process are studied from the design stage to putting manufacturing techniques into place to production planning and the organisation of workshops.

In addition, students will learn about important technological techniques (machine parts) as well as solid mechanics (elasticity and plasticity) in order to master the processing, behaviour and use of common materials. Finally, attention is paid to methods used in the fields of automation and robotics.

<table>
<thead>
<tr>
<th>Year</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Periodicity</th>
<th>Requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LGBIO2040</td>
<td>Biomechanics</td>
<td>Greet Kerckhofs</td>
<td>5</td>
<td>2q</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LGCIV2042</td>
<td>Dynamics of structures</td>
<td>Jean-Pierre Coyette</td>
<td>5</td>
<td>1q</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LMECA2170</td>
<td>Numerical Geometry</td>
<td>Vincent Legal Jean-François Remacle</td>
<td>5</td>
<td>1q</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LMECA2215</td>
<td>Vehicle System Dynamics</td>
<td>Paul Fisette</td>
<td>5</td>
<td>1q</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LMECA2355</td>
<td>Mechanical design in biomedical engineering</td>
<td>Greet Kerckhofs Benoît Raucent Ann Vankrunkelsven (compensates Benoît Raucent)</td>
<td>5</td>
<td>1q</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>LMECA2732</td>
<td>Introduction to robotics</td>
<td>Renaud Ronsse</td>
<td>5</td>
<td>2q</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LMECA2802</td>
<td>Multibody system Dynamics</td>
<td>Paul Fisette</td>
<td>5</td>
<td>2q</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LINMA2510</td>
<td>System Identification</td>
<td>Julien Hendrickx</td>
<td>5</td>
<td>2q</td>
<td></td>
</tr>
</tbody>
</table>

The class MECA 2732 may not be taken as part of this major by ELME students. Students majoring in this field may select:

De 20 à 30 credits parmi
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.

Visit http://www.scken.be/BEN for further information about course locations, hours and language. The student may select

De 17 à 23 credits parmi

<table>
<thead>
<tr>
<th>Year</th>
<th>Compulsory courses for the nuclear engineering major (11 credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LMECA2600 Introduction to nuclear engineering and reactor technology</td>
</tr>
<tr>
<td></td>
<td>Hamid Aït Abderrahim</td>
</tr>
<tr>
<td></td>
<td>30h+30h 5 Credits</td>
</tr>
<tr>
<td></td>
<td>1q X</td>
</tr>
<tr>
<td>2</td>
<td>LMECA2648 Nuclear thermal-hydraulics.</td>
</tr>
<tr>
<td></td>
<td>Yann Bartosiewicz</td>
</tr>
<tr>
<td></td>
<td>40h+7.5h 6 Credits</td>
</tr>
<tr>
<td></td>
<td>1q X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Elective courses for the nuclear engineering major</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LBNEN2002 Introduction to Nuclear Physics &amp; Measurements (Centre d'étude nucléaire-Mol)</td>
</tr>
<tr>
<td></td>
<td>3 Credits 1q X</td>
</tr>
<tr>
<td>2</td>
<td>LBNEN2003 Safety of Nuclear Powerplants (Centre d'étude nucléaire-Mol)</td>
</tr>
<tr>
<td></td>
<td>5 Credits 2q X</td>
</tr>
<tr>
<td>1</td>
<td>LBNEN2011 Radioprotection (Centre d'étude nucléaire-Mol)</td>
</tr>
<tr>
<td></td>
<td>3 Credits 1q X</td>
</tr>
</tbody>
</table>
## MAJOR IN AERONAUTICS

- **Mandatory**
- **Courses not taught during 2017-2018**
- **Optional**
- **Periodic courses not taught during 2017-2018**
- **Periodic courses taught during 2017-2018**
- **Activity with requisites**

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

### The student shall select
**De 15 à 30 credits parmi**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Hours</th>
<th>Credits</th>
<th>Year</th>
<th>Requisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGCIV2041</td>
<td>Numerical analysis of civil engineering structures</td>
<td>Jean-François Remacle</td>
<td>30h+15h</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2195</td>
<td>Gasdynamics and reacting flows</td>
<td>Miltiadis Papalexandris</td>
<td>30h+30h</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2300</td>
<td>Advanced Numerical Methods</td>
<td>Philippe Chatelain, Christophe Craeye, Vincent Legat, Jean-François Remacle</td>
<td>30h+30h</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2323</td>
<td>Aerodynamics of external flows</td>
<td>Philippe Chatelain, Grégoire Winckelmans</td>
<td>30h+30h</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2520</td>
<td>Calculation of planar structures</td>
<td>Issam Doghri</td>
<td>30h+30h</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2550</td>
<td>Aircraft propulsion systems.</td>
<td>Philippe Chatelain, Yves Marichal (compensates Philippe Chatelain)</td>
<td>30h+30h</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2660</td>
<td>Numerical methods in fluid mechanics</td>
<td>Grégoire Winckelmans</td>
<td>30h+30h</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2830</td>
<td>Aerospace dynamics.</td>
<td>Philippe Chatelain, Pierre Schrooyen (compensates Philippe Chatelain)</td>
<td>30h+30h</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2853</td>
<td>Turbulence.</td>
<td>Eric Deleersnijder, Grégoire Winckelmans</td>
<td>30h+30h</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
</tbody>
</table>
### MAJOR IN DESIGN, MANUFACTURING AND MECHANICS OF MATERIALS

- **Mandatory**
- **Optional**
- **Courses not taught during 2017-2018**
- **Periodic courses not taught during 2017-2018**
- **Activity with requisites**

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

The student shall select:

*De 15 à 30 credits parmi*  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMAPR2481</td>
<td>Deformation and fracture of materials</td>
<td>Thomas Pardoen</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMAPR2482</td>
<td>Plasticity and metal forming</td>
<td>Laurent Delannay, Thomas Pardoen</td>
<td>5</td>
<td>2q</td>
</tr>
<tr>
<td>LMECA2141</td>
<td>Rheology</td>
<td>Vincent Legat, Evelyne Van Ruymbeke</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2330</td>
<td>Machine components</td>
<td>Laurent Delannay, Benoit Raucent, Renaud Ronsse, Thomas Servais (compensates Benoit Raucent)</td>
<td>5</td>
<td>2q</td>
</tr>
<tr>
<td>LMECA2453</td>
<td>Advanced manufacturing technologies</td>
<td>Aude Simar</td>
<td>5</td>
<td>1q</td>
</tr>
<tr>
<td>LMECA2520</td>
<td>Calculation of planar structures</td>
<td>Issam Doghri</td>
<td>5</td>
<td>2q</td>
</tr>
<tr>
<td>LMECA2640</td>
<td>Mechanics of composite materials</td>
<td>Issam Doghri</td>
<td>5</td>
<td>2q</td>
</tr>
<tr>
<td>LMECA2860</td>
<td>Welding</td>
<td>Pascal Jacques, Aude Simar</td>
<td>5</td>
<td>1q</td>
</tr>
</tbody>
</table>
MAJOR IN BUSINESS CREATION AND MANAGEMENT

MAJOR IN BUSINESS RISks AND OPPORTUNITIES

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Optional</th>
</tr>
</thead>
</table>

Courses not taught during 2017-2018
Periodic courses taught during 2017-2018
Periodic courses not taught during 2017-2018
Activity with requisites

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

This major may not be taken as the same time as the major in small and medium size business creation. The student may De 16 à 20 credits parmi

### LFSA1290
Introduction to financial and accounting management
André Nsabimana (compensates Gerrit Sarens) Gemf Sarens
30h+15h
4 Credits
2q x x

### LFSA2140
Elements of law for industry and research
Werner Derijcke Bénédicte Inghels Christophe Lazaro
30h
3 Credits
1q x x

### LFSA2210
Organisation and human resources
John Cultiaux
30h
3 Credits
2q x x

### LFSA2230
Introduction to management and to business economics
Benoît Gailly
30h+15h
4 Credits
2q x x

### LFSA2245
Environment and business
Thierry Bréchet
30h
3 Credits
1q x x

#### One course between

De 3 à 5 credits parmi

### LFSA2202
Ethics and ICT
Axel Gosseries Olivier Pereira
30h
3 Credits
2q x x

### LLSMS2280
Business Ethics and Compliance Management
Carlos Desmet
30h
5 Credits
1q 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 SMALL AND MEDIUM SIZED BUSINESS CREATION

In keeping with most of the Masters’ degrees in civil engineering, the goal of this major is to familiarise the civil engineering student with the specifics of small and medium sized businesses, entrepreneurship, and business development in order to develop the necessary abilities, knowledge and tools to create a business. This major is reserved for a small number of students, selection of whom is based on a written application and individual interview. The written application must be submitted before the start of the academic year for Master’s 1.

Applications may be sent to:
Secrétariat CPME-Place des Doyens, 1
1348 Louvain-la-Neuve (tel. 010/47 84 59)

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

Further information about this major may be found at http://www.uclouvain.be/cpme. This major may not be taken at the same time as a major in management. Students in this major may choose

De 20 à 25 credits parmi

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor</th>
<th>Credits</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCPME2001</td>
<td>Entrepreneurship Theory (in French)</td>
<td>Frank Janssen</td>
<td>5</td>
<td>1q x</td>
</tr>
<tr>
<td>LCPME2002</td>
<td>Managerial, legal and economic aspects of the creation of a company (in French)</td>
<td>Yves De Cordt, Marine Falize</td>
<td>5</td>
<td>1q x x</td>
</tr>
<tr>
<td>LCPME2003</td>
<td>Business plan of the creation of a company (in French)</td>
<td>Frank Janssen</td>
<td>5</td>
<td>2q x</td>
</tr>
<tr>
<td>LCPME2004</td>
<td>Advanced seminar on Enterpreneurship (in French)</td>
<td>Roxane De Hoe</td>
<td>5</td>
<td>2q x</td>
</tr>
</tbody>
</table>

### Prerequisite CPME courses

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor</th>
<th>Credits</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCPME2000</td>
<td>Venture creation financement and management I</td>
<td>Yves De Rongé, Olivier Glacomin</td>
<td>5</td>
<td>1q x</td>
</tr>
</tbody>
</table>
ELECTIVE COURSES

Students may complete their major course programme with courses from the list below without special permission.

### ELECTIVE COURSES

<table>
<thead>
<tr>
<th>Elective Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Credits</th>
<th>Year</th>
<th>Periodicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LELEC1930</td>
<td>Introduction to telecommunication</td>
<td>Jérôme Louveaux</td>
<td>4</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LELEC2753</td>
<td>Electrical Power Systems: Advanced Topics</td>
<td>Emmanuel De Jaeger</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LELEC2920</td>
<td>Communication networks</td>
<td>Sébastien Lugan (compensates Benoît Maq) Benoît Maq</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LENVI2007</td>
<td>Renewable energies</td>
<td>Xavier Draye Patrick Gerin (coord.) Hervé Jeanmart Geoffrey Van Moeseke</td>
<td>4</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LFSA2212</td>
<td>Innovation classes</td>
<td>Pierre Latteur Benoît Maq Benoît Raucen</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LFSA2351A</td>
<td>Group dynamics</td>
<td>Piotr Sobieski (coord.) Vincent Wertz (coord.)</td>
<td>3</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LFSA2351B</td>
<td>Group dynamics</td>
<td>Piotr Sobieski (coord.) Vincent Wertz (coord.)</td>
<td>3</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LINMA2370</td>
<td>Modelling and analysis of dynamical systems</td>
<td>Jean-Charles Delvenne (coord.) Denis Dochain</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
<tr>
<td>LMECA1451</td>
<td>Mechanical manufacturing.</td>
<td>Laurent Delannay Aude Simar</td>
<td>5</td>
<td>1</td>
<td>x</td>
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<tr>
<td>LMECA2240</td>
<td>Testing of thermal machinery.</td>
<td>Hervé Jeanmart</td>
<td>2</td>
<td>2</td>
<td>x</td>
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<tr>
<td>LMECA2325</td>
<td>Biomass conversion</td>
<td>Patrick Gerin Hervé Jeanmart</td>
<td>5</td>
<td>1</td>
<td>x</td>
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<tr>
<td>LMECA2410</td>
<td>Dynamics of elastic systems</td>
<td>Jean-Pierre Coyette Laurent Delannay</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2420</td>
<td>Advanced topics in energetics.</td>
<td>Yann Bartosiewicz Hervé Jeanmart</td>
<td>3</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2645</td>
<td>Major technological hazards in industrial activity.</td>
<td>Denis Dochain Alexis Dutrieux</td>
<td>3</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2771</td>
<td>Thermodynamics of irreversible phenomena.</td>
<td>Milladis Papalexandris</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2780</td>
<td>Introduction to Turbomachinery</td>
<td>Tony Arts</td>
<td>5</td>
<td>2</td>
<td>x</td>
</tr>
<tr>
<td>LMECA2801</td>
<td>Machine design</td>
<td>Benoît Raucen Aude Simar</td>
<td>5</td>
<td>1</td>
<td>x</td>
</tr>
</tbody>
</table>
# COURS AU CHOIX : COMPÉTENCES TRANSVERSALES ET CONTACT AVEC L’ENTREPRISE

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courses not taught during 2017-2018</td>
<td>Periodic courses not taught during 2017-2018</td>
</tr>
<tr>
<td>Periodic courses taught during 2017-2018</td>
<td>Activity with requisites</td>
</tr>
</tbody>
</table>

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

De 3 à 21 credits parmi

## Communication

L’étudiant choisit maximum 8 crédits visant le développement de ses compétences de communication

`max=8 credits parmi`

## Languages

Students may select from any language course offered at the ILV. Special attention is placed on the following seminars in professional development:

<table>
<thead>
<tr>
<th>Courses</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LALLE2500</td>
<td>1</td>
</tr>
<tr>
<td>Professional development seminar German</td>
<td>2</td>
</tr>
<tr>
<td>LALLE2501</td>
<td>1</td>
</tr>
<tr>
<td>Professional development seminar-German</td>
<td>2</td>
</tr>
<tr>
<td>LESPA2600</td>
<td>1</td>
</tr>
<tr>
<td>Vocational Induction Seminar - Spanish (B2.2/C1)</td>
<td>2</td>
</tr>
<tr>
<td>LESPA2601</td>
<td>1</td>
</tr>
<tr>
<td>Vocational Induction Seminar - Spanish (B2.2/C1)</td>
<td>2</td>
</tr>
<tr>
<td>LNEER2500</td>
<td>1</td>
</tr>
<tr>
<td>Seminar of Entry to professional life in Dutch - Intermediate level</td>
<td>2</td>
</tr>
<tr>
<td>LNEER2600</td>
<td>1</td>
</tr>
<tr>
<td>Seminar of entry to professional life in Dutch - Upper-Intermediate level</td>
<td>2</td>
</tr>
</tbody>
</table>

## Group dynamics

<table>
<thead>
<tr>
<th>Courses</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFSA2351A</td>
<td>1</td>
</tr>
<tr>
<td>Group dynamics</td>
<td>2</td>
</tr>
<tr>
<td>LFSA2351B</td>
<td>1</td>
</tr>
<tr>
<td>Group dynamics</td>
<td>2</td>
</tr>
</tbody>
</table>

## Autre UE non disciplinaires

L’étudiant peut proposer maximum 8 crédits d’ouverture vers d’autres disciplines (maximum un cours BEST ou des UE hors EPL).

`max=8 credits parmi`

## Compétences transversales et contact avec l’entreprise

L’étudiant choisit minimum 3 crédits parmi un stage, un ou plusieurs cours de l’option "Enjeux de l’entreprise", l’option "CPME", une UE d’activité professionnelle liée à la discipline

`min=3 credits parmi`

## Internship

<table>
<thead>
<tr>
<th>Courses</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFSA2995</td>
<td>1</td>
</tr>
<tr>
<td>Company Internship</td>
<td>2</td>
</tr>
<tr>
<td>LFSA2996</td>
<td>1</td>
</tr>
<tr>
<td>Company Internship</td>
<td>2</td>
</tr>
</tbody>
</table>

## Professional integration activity specific to the program

Course prerequisites

A document entitled en-prerequis-2017-elme2m.pdf specifies the activities (course units - CU) with one or more pre-requisite(s) within the study programme, that is the CU whose learning outcomes must have been certified and for which the credits must have been granted by the jury before the student is authorised to sign up for that activity.

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

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

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

In addition, when the panel validates a student’s individual programme at the beginning of the year, it ensures the consistency of the individual programme:
- It can change a prerequisite into a corequisite within a single year (to allow studies to be continued with an adequate annual load);
- It can require the student to combine enrolment in two separate CUs it considers necessary for educational purposes.

For more information, please consult regulation of studies and exams.

The programme’s courses and learning outcomes

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

The document is available by clicking this link after being authenticated with UCL account.
ELME2M - Information

Admission

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

This programme is taught in English with no prerequisite in French. The student is supposed to have at least a B2 level in the European Framework of Reference.

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

University Bachelors

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Special Requirements</th>
<th>Access</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCL Bachelors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor in Engineering</td>
<td></td>
<td>Direct access</td>
<td>Students who have neither major nor minor in the field of their civil engineering Master's degree may have an adapted master programme.</td>
</tr>
</tbody>
</table>

Others Bachelors of the French speaking Community of Belgium

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Special Requirements</th>
<th>Access</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor in engineering</td>
<td></td>
<td>Direct access</td>
<td>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.</td>
</tr>
</tbody>
</table>

Bachelors of the Dutch speaking Community of Belgium

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Special Requirements</th>
<th>Access</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor in engineering</td>
<td></td>
<td>Direct access</td>
<td>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.</td>
</tr>
</tbody>
</table>

Foreign Bachelors

Non university Bachelors

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Access</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&gt; Find out more about links to the university</td>
</tr>
</tbody>
</table>

Holders of a 2nd cycle University degree

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Special Requirements</th>
<th>Access</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Licenciés&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Masters

<table>
<thead>
<tr>
<th>Master in engineering</th>
<th>Direct access</th>
</tr>
</thead>
</table>

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Holders of a non-University 2nd cycle degree

<table>
<thead>
<tr>
<th>Diploma</th>
<th>Access</th>
<th>Remarks</th>
</tr>
</thead>
</table>

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Adults taking up their university training

> See the website Valorisation des acquis de l'expérience

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

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Personalized access

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

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.

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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 LFS2A351). This class provides its participants with practical tutoring techniques to help fellow students.

Methods that promote multidisciplinary studies

UCL’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.

In the last year of the programme, half of the time is devoted to the graduation project, which offers students the possibility of working as part of a research team or collaborating with the industrial sector to study a given subject in-depth. It 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).

Diverse learning situations

Various pedagogical approaches are used: lectures, projects, exercise sessions, problem solving sessions, case studies, experimental laboratories, computer simulations, educational software, internships in industry or research, factory visits, seminars and group as well as individual work. In certain subjects, eLearning allows students to learn at their own pace and carry out virtual experiments.

These diverse learning situations permit students to build their knowledge in an iterative and progressive manner all the while developing their independence, organisational and time management skills as well as their ability to communicate. Students have access to the newest information technology (materials, software, networks) during their studies.

Evaluation

The evaluation methods comply with the regulations concerning studies and exams. More detailed explanation of the modalities specific to each learning unit are available on their description sheets under the heading “Learning outcomes evaluation method”.

Student work is evaluated according to University rules (see the rules for evaluating coursework and exams) namely written and oral exams, laboratory exams, individual or group work, public presentations of projects and theses defences.

ELME Evaluation Methods

<table>
<thead>
<tr>
<th>Axis 1 et 2</th>
<th>Axis 3</th>
<th>Axis 3, 4, 5 et 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate-based evaluation</td>
<td>End of the semester exam based on course exercises</td>
<td>Report on mini project in field of study</td>
</tr>
<tr>
<td>Formative evaluation</td>
<td>Progress report on multidisciplinary project</td>
<td>Report, public presentation, and yearly work for graduation project</td>
</tr>
</tbody>
</table>

The certificate-based evaluation for Axes 1 and 2 is mainly achieved through exams at the end of the semester. Exam questions primarily have to do with class exercises. This is in keeping with the description of skills and knowledge to be acquired by the end of the programme (see above).

For certain introductory classes given during the Bachelor’s degree programme (BAC 12 and 13), a certificate-based test is given mid-semester. This test allows students to assess their educational progress. This is notably the case for LMECA 1901 (continuum mechanics) or LELEC1370 (circuits and electrical measures).

The objectives of Axis 3 are achieved through disciplinary mini-projects carried out in small groups. Where applicable, the mini-project is evaluated and the mark is included in 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 MECA2821. In this case the APP group reports contribute to the student’s final mark.

The interdisciplinary projects LELME2002 or LELME2003 target the learning objectives in Axes 2-6. Their evaluation includes the continuous evaluation of the following skills: writing specifications, carrying out a mock up or preliminary project, writing a report, group work, planning group work, thesis defence before a jury, carrying out a project and choosing appropriate technical solutions.

The evaluation of the graduation project (TFE) is aligned with the learning outcomes in Axes 2-6.

In order to improve students’ communication skills (Axis 5), practice presentations are organised about two months before the graduation project presentations.

The formative evaluation of Axis 6 is achieved in part during the projects required for LELME2002 or LELME 2003 via tutor feedback and above all during the graduation project. Given the nature of the graduation project, the topics outlined in Axes 6.2 and 6.3 are more or less accounted for.

For more information on evaluation methods, students may consult the relevant evaluation descriptions.

To obtain a passing grade, the marks received for the teaching units are offset by their respective credits.
Mobility and/or Internationalisation outlook

Since its creation, the Louvain School of Engineering (EPL) has participated in diverse exchange programs that were put into place at the European level and beyond.

Possible trainings at the end of the programme

Specialised Master’s Degrees

- Specialised Master’s Degree in Nanotechnology
- Specialised Master’s Degree 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’s degree (120) in sciences and environmental management and the Master’s degree (60) in sciences and environmental management (automatic admission with possible complementary coursework)
- Different Master’s degree programmes in management (automatic admission based on written application): see this list
- The Master’s degree (60) in information and communication at Louvain-la-Neuve or the Master’s degree (60) in information and communication at Mons

Contacts

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Sector: Sciences and Technology (SST)
Acronym: ELME
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