UCLouvain

FYAP2M

2022 - 2023

Master [120] in Physical Engineering

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 : **YES**
Activities on other sites : **NO**
Main study domain : **Sciences de l'ingénieur et technologie**
Organized by: **Louvain School of Engineering (EPL)**
Programme acronym: **FYAP2M** - Francophone Certification Framework: 7

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FYAP2M - Introduction

Introduction

Introduction

The Master's degree programme in Physical Engineering is multidisciplinary due to the in-depth study of various fields pertaining to physics and a wide range of industrial professions and specialisations as well as research based on advanced technologies.

This Master's degree programme is founded on:

- Formal concepts associated with the field
- The use numerical simulation tools
- Experiments based on practical work

Your profile

You

- Have solid knowledge of physics and mathematics;
- Seek a programme that focuses on current technological and scientific issues and the national and international job market
- Want to participle in the design of high tech products: optics, thin strata, magnetic devices, transducers, sensors, nuclear tools, quantum physics, electronic materials, systems based on the interaction of radiation materials or objects produced from nanotechnologies

Your future job

Civil engineers are present in all industrial sectors: the chemical industry, pharmaceuticals and food production, electronics and telecommunication industry, energy, metallurgy, aeronautics, design and civil engineering, large scale distribution, banking or consulting services, nanotechnologies and medical technology, etc.

They play a role as researchers and developers overseeing production or management and holding positions in marketing and sales (of high tech products).

We find them in finance departments, information technology fields, quality control, the public sector, higher education and the Ministry of equipment and transport (www.fabi.be)

Your programme

This Master's degree offers:

- Solid training applied physics
- An interdisciplinary approach at the interface between physics and material sciences
- Experience in laboratories and with research projects
- Exposure to the industrial sector: factory visits, internships, projects carried out in companies
- The opportunity to complete coursework abroad

This Master's degree programme consists of compulsory classes that aim to round out basic knowledge as well as a large selection of elective courses grouped into five majors that may potentially be completed by classes taken at UCL.

FYAP2M - Teaching profile

Learning outcomes

Physical engineers master the physical aspects of how objects function and their interaction with the environment (waves, light, ions, electric and magnetic fields, temperature gradients). Physical engineers have dual training in experiments and simulation. They are capable of using theories and formal representations of objects thanks to numerical simulation tools. They are also capable of carrying out laboratory-based experiments. Their comprehensive understanding of physical properties allows them to make the connection between properties on an atomic scale with those that are macroscopic.

Due to the in-depth study of different fields of physics (material physics, optics, electromagnetics, electronics, mechanics, quantum physics, etc.), the Master's degree programme in physical engineering (FYAP) prepares students for numerous jobs and specialisations in the industrial sector as well as participation in research-based technological activities.

Physical engineers are called on to resolve technological problems that are often complex and multidisciplinary in nature, linked to the design and creation of materials, devices and systems. They can act as an interface between different professions that use functional materials. They are called on to innovate in a specific technological environment.

Physical engineers systematically take into account constraints, values, rules (both legal and ethical) and economics. Their solid scientific background allows them to be autonomous enough to manage complex industrial projects. They are comfortable working as part of a team and communicating effectively even in English.

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

1.Demonstrating their mastery of a solid body of knowledge in basic engineering sciences allowing them to understand and solve problems related to technological and industrial applications in the physical sciences.

1.1 Identify and use concepts, laws, and appropriate reasoning to solve a given problem (for example, identifying laws and materials to go from LED to white light; designing energy convertors based on thermoelectric elements; creating materials and devices to store and/or transfer information; designing photovoltaic panels with optimal output.)
1.2 Identify and use appropriate modelling and calculation tools to solve problems.
1.3 Verify solutions to a given problem.

2.Organise and carry out an engineering process in a high-tech field that requires the use of fundamental tools and concepts in order to solve a particular problem.

2.1 Analyse a problem and formulate a specifications note.
2.2. Model the problem and design one or more original technical solutions in response to the specifications note (for example, the optimisation and/or combination of materials for thermal insulation), develop measures for electrical and thermal classification of a given material, choose materials for light emission (LEDs) or the creation of photovoltaic panels.
2.3 Evaluate and classify solutions in terms of all the figures in specifications notes: efficiency, feasibility, quality, ergonomics, and security in the professional environment.
2.4 Implement and test a solution through a mock-up or a prototype and/or a numerical model.
2.5 Make recommendations to improve the operational character of a solution under consideration.

3.Organise and carry out a research project to understand a new technological or industrial problem in different areas of applied physics or high tech engineering.

3.1 Document and summarize the existing body of knowledge.
3.2 Suggest a model and/or an experimental device allowing for the simulation and testing of hypotheses related to the phenomenon being studied.
3.3. Write a summary report explaining the potentialities of the theoretical and/or technical innovation resulting from the research project.

4.Contribute as part of a team to the planning and completion of a project while taking into account its objectives, allocated resources, and constraints.

4.1 Frame and explain the project's objectives (in terms of performance indicators) while taking into account its issues and constraints (resources, budget, deadlines).
4.2 Collaborate on a work schedule, deadlines and roles, for example the division of labour among students.
4.3 Work in a multidisciplinary environment with peers holding different points of view; manage any resulting disagreement or conflicts.
4.4 Make team decisions (whether they be about technical solutions or the division of labour).

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

5.1 Identify the needs of the client or the user: question, listen and understand all aspects of their request and not just the technical aspects (for example, select the best-suited equipment for the material concerned, select the best material according to the desired functionalities and systems integration).
5.2 Present your arguments and convince your interlocutors (technicians, colleagues, clients, superiors) of your technological choices by adopting their language.
5.3 Communicate through graphics and diagrams: interpret a diagram, present results, structure information.
5.4 Read and analyse different technical documents, plans, specification notes: progress of physical properties in function of materials, temperature, mechanical limits or external fields, phase diagrams, band structures, etc.
5.5 Draft documents that take into account contextual requirements and social conventions.
5.6 Make a convincing oral presentation using modern communication techniques.

6.Demonstrate rigor, openness and critical and ethical awareness in your work: using the technological and scientific innovations at your disposal validate the socio-technical relevance of a hypothesis or a solution.

6.1 Rigorously apply the field's standards (terms, units of measure, quality standards and security).

6.2 Find solutions that go beyond strictly technical issues by considering sustainable development and the socio-economic ethics of a project (for example, “life cycle anaylsis”).
6.3 Demonstrate critical awareness of a technical solution in order to verify its robustness and minimize the risks that may occur during implementation (this skill is mainly developed through the graduation project as either a critical analysis of manufacturing and classification techniques or a discussion of research perspectives and development as part of a Master’s thesis).
6.4 Evaluate oneself and independently develop necessary skills for “lifelong learning” (this skill is mainly developed as part of class projects requiring bibliographic research).

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.

FYAP2M Programme

Detailed programme by subject

CORE COURSES

Mandatory
Optional
Not offered in 2022-2023
Not offered in 2022-2023 but offered the following year
Offered in 2022-2023 but not the following year
Not offered in 2022-2023 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...)

LELEC 1755 is not compulsory unless it was not taken in the 1st cycle.

				Year 1	2
LFYAP2990	Graduation project/End of studies project *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.*		[EN] [q1+q2] [] [25 Credits]		x
LEPL2020	Professional integration work *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 que dans son programme de bloc annuel 2.*	Myriam Banaï Francesco Contino (coord.) Delphine Ducarme Jean-Pierre Raskin	[EN] [q1+q2] [30h+15h] [2 Credits] *> French-friendly*	x	x

				Year 1	2
LELEC1755	Physics of electronic devices and transmission lines	Denis Flandre (coord.) Claude Oestges	[q1] [30h+30h] [5 Credits]	x	

PROFESSIONAL FOCUS [30.0]

- Mandatory
- Optional
- Not offered in 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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
LMAPR2014	Physics of Functional Materials	Xavier Gonze Luc Piraux Gian-Marco Rignanese	EN [q1] [37.5h+22.5h] [5 Credits] *> French-friendly*	x	
LMAPR2451	Atomistic and nanoscopic simulations	Jean-Christophe Charlier Xavier Gonze Gian-Marco Rignanese	EN [q2] [30h+30h] [5 Credits] *> French-friendly*	x	
LMAPR2471	Transport phenomena in solids and nanostructures	Jean-Christophe Charlier Luc Piraux	EN [q2] [30h+30h] [5 Credits] *> French-friendly*	x	
LMAPR2481	Deformation and fracture of materials	Hosni Idrissi Thomas Pardoen	EN [q1] [30h+30h] [5 Credits] *> French-friendly*	x	x
LPHYS2143	Optics and lasers	Clément Lauzin	EN [q1] [22.5h+22.5h] [5 Credits] *> French-friendly*	x	x
LMAPR2019A	Polymer Science and Engineering-Physics	Sophie Demoustier Alain Jonas (coord.) Evelyne Van Ruymbeke	EN [q1] [22.5h+7.5h] [3 Credits] *> French-friendly*	x	x
LCHM2261B	Polymer Chemistry and Physical Chemistry (part 2 : Polymer Physical Chemistry)	Charles-André Fustin Jean-François Gohy Alain Jonas	EN [q1] [22.5h+7.5h] [2 Credits] *> French-friendly*	x	x

OPTIONS

Dans la rubrique "Options du master ingénieur civil physicien", l'étudiant·e doit valider au moins une des options proposées. Dans la rubrique "Options et cours au choix en connaissances socioéconomiques", l'étudiant·e valide une des deux options ou choisit obligatoirement au minimum 3 crédits parmi les cours au choix ou les cours de l'option en enjeux de l'entreprise.

Majors for the Master's degree in physics

> Major in Advanced Engineering Physics *[en-prog-2022-fyap2m-lfyap221o]*
> Major in nanotechnology *[en-prog-2022-fyap2m-lfyap225o]*
> Major advanced electronic materials and devices *[en-prog-2022-fyap2m-lfyap223o]*

Options et cours au choix en connaissances socio-économiques

> Business risks and opportunities *[en-prog-2022-fyap2m-lfyap230o]*
> Major in small and medium sized business creation *[en-prog-2022-fyap2m-lfyap231o]*
> Cours au choix en connaissances socio-économiques *[en-prog-2022-fyap2m-lfyap200o]*

Others elective courses

> Others elective courses *[en-prog-2022-fyap2m-lfyap952o]*

MAJORS FOR THE MASTER'S DEGREE IN PHYSICS

MAJOR IN ADVANCED ENGINEERING PHYSICS

- O Mandatory
- ⊠ Optional
- △ Not offered in 2022-2023
- ⊘ Not offered in 2022-2023 but offered the following year
- ⊕ Offered in 2022-2023 but not the following year
- △ ⊕ Not offered in 2022-2023 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)

O *Content:*

				Year 1	Year 2
⊠ Optics and photonics					
⊠ LPHYS2141	Introduction to quantum optics	Matthieu Génévriez Xavier Urbain	EN [q1] [22.5h+7.5h] [5 Credits] *> French-friendly*	x	x
⊠ LPHYS2246	Experimental methods in atomic and molecular physics	Clément Lauzin Xavier Urbain	EN [q2] [30h] [5 Credits] *> French-friendly*	x	x
⊠ Experimental methods					
⊠ LELEC2811	Instrumentation and sensors	David Bol (coord.) Laurent Francis	EN [q1] [30h+30h] [5 Credits] *> French-friendly*	x	x
⊠ LPHYS2245	Lasers physics	Clément Lauzin	EN [q2] [22.5h+7.5h] [5 Credits] *> French-friendly*	x	x
⊠ LPHYS2303	Cryophysics and vacuum physics	Vincent Bayot Benoît Hackens Sorin Melinte	EN [q1] [30h+15h] [5 Credits] *> French-friendly*	x	x
⊠ LPHYS2351	Superconductivity	Luc Piraux	EN [q1] [22.5h+7.5h] [5 Credits] *> French-friendly*	x	x
⊠ LPHYS2102	Ionizing Radiation Detection and Nuclear Instrumentation	Eduardo Cortina Gil	EN [q1+q2] [26h+26h] [5 Credits]	x	x
⊠ LPHYS2248	Ultra-fast laser physics	Clément Lauzin	EN [q2] [22.5h+7.5h] [5 Credits] ⊘ *> French-friendly*	x	x

			Year 1	Year 2
Numerical simulations				
LMAPR2483	Durability of materials	Laurent Delannay Thomas Pardoen	EN [q2] [30h+22.5h] [5 Credits] *> French-friendly*	x	x
LPHYS1303	Numerical Simulation in Physics	Francesco Ragone	EN [q2] [22.5h+30h] [4 Credits] *> English-friendly*	x	x
Fundamental concepts of physics				
LPHYS1231	Special Relativity	Marco Drewes	FR [q2] [30h+15h] [5 Credits]	x	x
LPHYS1344	Subatomic, atomic and molecular physics	Christophe Delaere Matthieu Génévriez Clément Lauzin	FR [q2] [45h+45h] [6 Credits]	x	x
LPHYS2242	Fundamentals of quantum information	Matthieu Génévriez Sorin Melinte Bernard Piraux	EN [q2] [30h] [5 Credits] *> French-friendly*	x	x

MAJOR IN NANOTECHNOLOGY

The objective of this major is to introduce students to physics and the simulation of materials and devices used in the field of micro and nano-electronics, to the properties and methods associated with the manufacturing and classification of micro and nano-structures; to the ways in which nano-devices function as well as the development and integration of organic elements into nano-systems.

- Mandatory
- Optional
- Not offered in 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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)

Content:

				Year 1	Year 2
Nano-structures and the physics of nano-materials					
To enrol in this major, students should have already taken a physical materials class such as MAPR1492.					
LMAPR2015	Physics of Nanostructures	Jean-Christophe Charlier (coord.) Xavier Gonze Luc Piraux	EN [q1] [37.5h+22.5h] [5 Credits] > *French-friendly*	x	x
LMAPR2451	Atomistic and nanoscopic simulations	Jean-Christophe Charlier Xavier Gonze Gian-Marco Rignanese	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
LPHYS2351	Superconductivity	Luc Piraux	EN [q1] [22.5h+7.5h] [5 Credits] > *French-friendly*	x	x
Nano and micro semi-conductor devices					
To enrol in these courses it is recommended that students have already taken a course in physical electronics or in semiconductor devices such as ELEC 1330 or ELEC 1755 or similar.					
LELEC2541	Advanced Transistors	Denis Flandre Benoît Hackens Jean-Pierre Raskin	EN [q2] [30h+22.5h] [5 Credits] > *French-friendly*	x	x
LELEC2550	Special electronic devices	Vincent Bayot	EN [q1] [30h+15h] [5 Credits] > *French-friendly*	x	x
LELEC2710	Nanoelectronics	Vincent Bayot (coord.) Benoît Hackens	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
Micro and nano-engineering					
LELEC2560	Micro and Nanofabrication Techniques	Laurent Francis (coord.) Benoît Hackens Jean-Pierre Raskin	EN [q2] [30h+30h] [5 Credits] > *French-friendly*	x	x
LELEC2895	Design of micro and nanosystems	Laurent Francis	EN [q1] [30h+30h] [5 Credits] > *French-friendly*	x	x
LMAPR2012	Macromolecular Nanotechnology	Sophie Demoustier Karine Glinel Karine Glinel (compensates Jean-François Gohy) Bernard Nysten	EN [q2] [45h+15h] [5 Credits] > *French-friendly*	x	x
LMAPR2631	Surface Analysis	Arnaud Delcorte Bernard Nysten	EN [q2] [30h+15h] [5 Credits] > *French-friendly*	x	x

MAJOR ADVANCED ELECTRONIC MATERIALS AND DEVICES

- Mandatory
- Optional
- Not offered in 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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 15 to 30credit(s)

Content:

Compulsory courses in advanced electronic materials and devices

Student choose at least 5 credits among:

				Year 1	Year 2
LELEC2541	Advanced Transistors	Denis Flandre Benoît Hackens Jean-Pierre Raskin	EN [q2] [30h+22.5h] [5 Credits] > French-friendly	x	x
LELEC2550	Special electronic devices	Vincent Bayot	EN [q1] [30h+15h] [5 Credits] > French-friendly	x	x
LELEC2700	Microwaves	Dimitri Lederer	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LELEC2895	Design of micro and nanosystems	Laurent Francis	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x

Elective courses in advanced electronic materials and devices

				Year 1	Year 2
LELEC2560	Micro and Nanofabrication Techniques	Laurent Francis (coord.) Benoît Hackens Jean-Pierre Raskin	EN [q2] [30h+30h] [5 Credits] > French-friendly	x	x
LELEC2580	Design of RF and microwave communication circuits	Christophe Craeye Dimitri Lederer	EN [q2] [30h+30h] [5 Credits] > French-friendly	x	x
LELEC2710	Nanoelectronics	Vincent Bayot (coord.) Benoît Hackens	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LELEC2811	Instrumentation and sensors	David Bol (coord.) Laurent Francis	EN [q1] [30h+30h] [5 Credits] > French-friendly	x	x
LMAPR2015	Physics of Nanostructures	Jean-Christophe Charlier (coord.) Xavier Gonze Luc Piraux	EN [q1] [37.5h+22.5h] [5 Credits] > French-friendly	x	x
LMAPR2020	Materials Selection	Bernard Nysten Thomas Pardoen	EN [q2] [30h+22.5h] [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]	x	x
LPHYS2143	Optics and lasers	Clément Lauzin	EN [q1] [22.5h+22.5h] [5 Credits] > French-friendly	x	x
LPHYS2303	Cryophysics and vacuum physics	Vincent Bayot Benoît Hackens Sorin Melinte	EN [q1] [30h+15h] [5 Credits] > French-friendly	x	x
LELEC2350	Electromagnetic waves	Christophe Craeye Dimitri Lederer	EN [q2] [30h+30h] [5 Credits] > French-friendly	x	x

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

BUSINESS RISKS AND OPPORTUNITIES

- Mandatory
- Optional
- Not offered in 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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	Benoît Gailly	EN [q2] [30h] [3 Credits] *> French-friendly*	x	x
LEPL2212	Financial performance indicators	André Nsabimana	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)

LEPL2210	Ethics and ICT	Axel Gosseries 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	FR [q2] [45h+20h] [6 Credits]	x	x
MLSMM2136	Trends in Digital Marketing	Ingrid Poncin	FR [q2] [30h] [5 Credits]		x
MLSMM2134	e-Consumer Behavior	Karine Charry	FR [q2] [30h] [5 Credits]		x

Cours en Sourcing and Procurement

LLSMS2036	Supply Chain Procurement	Constantin Blome Antony Paulraj (compensates Per Joakim Agrell)	EN [q1] [30h] [5 Credits]	x	x
LLSMS2038	Procurement Organisation and Scope	Constantin Blome	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 SMALL AND MEDIUM SIZED BUSINESS CREATION

Commune à la plupart des masters de l'EPL, cette option a pour objectif de familiariser l'étudiant·e avec les spécificités de l'entreprenariat 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 création d'entreprise (CPME) 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 CPME 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 www.uclouvain.be/cpme.

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 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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:

Required courses for the major in small and medium sized businesses

				Year 1	Year 2
LCPME2001	Théorie de l'entrepreneuriat	Frank Janssen	FR [q1] [30h+20h] [5 Credits]	x	
LCPME2002	Aspects juridiques, économiques et managériaux de la création d'entreprise	Yves De Cordt Marine Falize	FR [q1] [30h+15h] [5 Credits]	x	
LCPME2003	Plan d'affaires et étapes-clefs de la création d'entreprise *Les séances du cours LCPME2003 sont réparties sur les deux blocs annuels du master. L'étudiant doit les suivre dès le bloc annuel 1, mais ne pourra inscrire le cours que dans son programme de bloc annuel 2.*	Frank Janssen	FR [q2] [30h+15h] [5 Credits]		x
LCPME2004	Séminaire d'approfondissement en entrepreneuriat	Frank Janssen	FR [q2] [30h+15h] [5 Credits]	x	

Prerequisite CPME courses

Student who have not taken management courses during their previous studies must enroll in LCPME2021.

LCPME2021	Financer son projet	Yves De Rongé	FR [q2] [30h+15h] [5 Credits]	x	

COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

- Mandatory
- Optional
- Not offered in 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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	Year 2
Content:					
LFSA2995	Company Internship	Dimitri Lederer Jean-Pierre Raskin	EN [q1+q2] [30h] [10 Credits]	x	x
LFSA2212	Innovation classes	Benoît Macq Jean-Pierre Raskin Benoît Raucent	EN [q1] [30h+15h] [5 Credits] *> French-friendly*	x	x

OTHERS ELECTIVE COURSES

OTHERS ELECTIVE COURSES

- Mandatory
- Optional
- Not offered in 2022-2023
- Not offered in 2022-2023 but offered the following year
- Offered in 2022-2023 but not the following year
- Not offered in 2022-2023 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:

Les étudiant·e·s peuvent également inscrire à leur programme tout cours faisant partie des programmes d'autres masters de l'EPL moyennant l'approbation du jury restreint.

Languages

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

				Year 1	Year 2
LALLE2500	Professional development seminar German	Caroline Klein (coord.)	DE [q1+q2] [30h] [3 Credits]	x	x
LALLE2501	Professional development seminar-German	Caroline Klein (coord.)	DE [q1+q2] [30h] [5 Credits]	x	x
LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Rocio Cuberos Vicente Paula Lorente Fernandez (coord.)	ES [q1] [30h] [3 Credits]	x	x
LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Rocio Cuberos Vicente Paula Lorente Fernandez (coord.)	ES [q1] [30h] [5 Credits]	x	x
LNEER2500	Seminar of Entry to professional life in Dutch - Intermediate level	Marie-Laurence Lambrecht (coord.)	NL [q1 or q2] [30h] [3 Credits]	x	x

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

⊠ Group dynamics

⊠ LEPL2351	Group dynamics - Q1	Delphine Ducarme Claude Oestges (coord.) Thomas Pardoen Benoît Raucent	FR [q1] [15h+30h] [3 Credits]	x	x
⊠ LEPL2352	Group dynamics - Q2	Delphine Ducarme Claude Oestges (coord.) Thomas Pardoen Benoît Raucent	FR [q2] [15h+30h] [3 Credits]	x	x

⊠ Autres UEs hors-EPL

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

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 puposes 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).

 # Prerequisities 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 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.

FYAP2M - Information

Access Requirements

Master course admission requirements are defined by the French Community of Belgium Decree of 7 November 2013 defining the hiher 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 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 enginering master degree may have an adapted master programme with up to 60 additional credits.
Foreign Bachelors			
Bachelor in engineering	Bachelors degree of Cluster Institution	Direct access	Students with a Bachelor’s degree in engineering sciences who have not taken the equivalent of a minor in the field of their civil 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		
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

Teaching method

Methods that promote multidisciplinary studies

The Master's degree programme in physical engineering is interdisciplinary because acts as an interface between physics and materials science. Its versatile foundation exposes students to the wide scope of applied physics from practical training and cutting edge research to majors in the main branches of physics and materials science: nano-technologies, materials science, photovoltaics, fundamental and applied physics and light-matter interaction. Students also have the possibility of studying management thanks to majors in management and small and medium sized business creation. The programme includes a significant portion of the classes with the PHYS (or PHY) designation as well as MATH, INMA and MECA classes, which is evidence of the programme's multidisciplinary nature. Finally students are allowed to select up to 40 credits of elective courses offered as part of the programmes in natural sciences or medicine at UCL and up to 6 credits of courses in human sciences, which allows for tailor made course schedules.

Various teaching strategies

The pedagogy used in the Master's degree programme in physical engineering is consistent with that of the Bachelor's degree programme in engineering sciences: active learning, an equal mix of group work and individual work, and emphasis on the development of non-technical skills. A major characteristic of the programme is the immersion of students in professors' research laboratories (and at times teaching laboratories, case studies, projects, theses) that expose students to advanced methods used in the discipline and allows them to learning by questioning, a process inherent in the research process. An optional 9-week internship of 10 credits (or 5 credits if completed alongside a thesis) places students at the centre of research and allows them to develop their skills through their contact with the professional world.

Diverse learning situations

Students will be exposed to varied pedagogical methods: lectures, projects, exercise tutorials, problem-solving sessions, case studies, experimental laboratories, computer simulations, internships in industry or research, graduation projects, group work, individual work, conferences given by outside researchers, exposure to cutting edge research, etc. This variety of teaching techniques allows students to learn in an iterative and progressive manner all the while developing their autonomy as well as their organisational, time management and communication skills.

Evaluation

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

Evaluation methods conform to the rules used to evaluate coursework and exams. Further details about the methods specific to each academic department may be found in their respective evaluation descriptions ("Evaluating students' knowledge").

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. Professors provide details about evaluation methods used in their courses at the beginning of each semester.

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

Master's degree programmes

The Master's degree programme in nanotechnology and the Master's degree in nuclear engineering are natural continuations of the M.A. in physical engineering.

Doctoral degree programmes

The Master's degree programme in physical engineering prepares students for doctoral programmes. The programme's professors are members of the MAIN ("Materials, Interfaces and Nanotechnology) doctoral programme and interested students are welcome to pursue a doctoral degree.

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

For example:

- Different Master's degree programmes in management (automatic admission based on written application): 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

Curriculum Management

Entity

Structure entity	SST/EPL/FYKI
Denomination	(FYKI)
Faculty	Louvain School of Engineering (EPL)
Sector	Sciences and Technology (SST)
Acronym	FYKI
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Academic supervisor: Pascal Jacques

Jury

- Claude Oestges
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