UCLouvain

KIMA2M

2021 - 2022

Master [120] in Chemical and Materials 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 : **optional**
Main study domain : **Sciences de l'ingénieur et technologie**
Organized by: **Louvain School of Engineering (EPL)**
Programme acronym: **KIMA2M** - Francophone Certification Framework: 7

Table of contents

KIMA2M - Introduction

Introduction

Introduction

In order to meet essential challenges such as energy management, communication and information, sustainable development and climate change, it is essential to foster scientific and technological creativity in the field of industrial materials and processes.

You

• have acquired solid knowledge of chemical or physical engineering and mathematics;

• are interested in research and development as well as production and management in cutting edge industries: chemistry, metals and materials, metallic products, plastics, electronics or the process industry;

• would like to take advantage of the most recent research advances in your area of specialisation.

Your future job

Jobs in chemical and materials engineering range from research and development to production and marketing.

You can become :

• A « systems » engineer :

Who designs new products or devices with specific properties or functions, e.g. a mitral valve, an electroluminescent polymer for a flexible display, a metallic alloy or a light composite for aerospace applications, a nanomaterial usable for memory storage.

• A « process » engineer :

Who develops new production processes or manages the operation of production units, e.g. a plastics extrusion line, a factory for the extraction of a pharmaceutical compounds from a given plant l, a water or waste treatment plant, a production line for electronic components, a production unit for a high purity chemical compound, etc.

• A combination of both :

For instance, you develop a polymer material for the automotive industry and the synthesis/compounding process required for its industrial scale up.

Your programme

The master offers:

• a specialised training in an international environment; from 2015-2016, all courses organized by the programme commission (i.e. courses with LMAPR2xxx designation) are taught in English ; assistance provided as needed to French-speaking students (“French-friendly” approach).

• an interdisciplinary approach to problem solving, rooted in physics and chemistry;

• research-based training : integration of students in experimental laboratories, research projects ;

• exposure to industry : factory visits, industry internships, graduation project in a company ;

• the possibility to obtain a dual degree if you are accepted in the Master’s degree programme “Functionalised Advanced Materials & Engineering” (FAME), part of the Erasmus Mundus programme. It is entirely in English and starts with a year of general training either at the National Polytechnic Institute of Grenoble (France) or at the University of Augsburg (Germany); in the second year, students specialise in a field of materials sciences at one of 7 partner universities. UCL offers a specialisation in materials and nano-structures engineering. Upon completing the programme, students are granted a dual Master’s degree. More information available on the web page https://www.uclouvain.be/master-fame.html

KIMA2M - Teaching profile

Learning outcomes

Building on fundamental scientific and technical knowledge (physics, chemistry, mechanics, mathematics) acquired during the Bachelor's program, the master's program in chemistry and materials science enables the student to develop polytechnic as well as specialized competences relating to materials, nanotechnology, as well as chemical and environmental engineering, which will allow him/her to fill leadership positions in the design and production of advanced materials and systems as well as the development and management of advanced technological processes.

The program takes up the broad challenges confronting today's engineers, thanks to a curriculum taught entirely in English (courses with MAPR2xxx designation) with assistance provided to French-speaking students.

The program combines coherence and flexibility thanks to a modular structure : a specialized focus and a common core taken by all students, complemented by major and elective courses, which provides students with a specific focus to their training. Depending on the majors chosen, the student may become :

• A systems engineer who designs new products or devices with targeted properties and functions;

• A process or chemical engineer who develops new production processes and optimizes or manages production facilities;

• A combination of both.

Through these activities, the chemical and materials engineer systematically takes into account constraints, values and rules (legal, ethical or economic).

He/she is autonomous, capable of managing industrial projects and comfortable working as part of a team. He/she is able to communicate in a foreign language, English in particular.

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

1.demonstrate mastery of a solid body of knowledge and skills in engineering sciences allowing one to solve problems related to materials and procedures (axis 1).

1.1 Identify and use concepts, laws and reasoning to solve a realistic problem.
1.2 Identify, develop and use adequate modelling and calculation tools to solve realistic and complex problems.
1.3 Verify the likelihood and confirm the validity of the results relating to a given problem.

2. organise and carry out an engineering procedure for the development of a specific material, a complex material system, a high purity product and/or complex compound or a process meeting a need or solving a particular problem (axis 2).

2.1 Analyse a problem or functional requirement of realistic complexity and formulate a corresponding specifications note. An industrial specification for a material or a process contains many elements ranging from technical demands, to economic and logistic constraints as well as legal and safety aspects.

2.2 Model a problem and design one or more original technical solutions corresponding to the specifications note.

2.3 Evaluate and classify solutions with regard to all the criteria in the specifications note: efficiency, feasibility, quality, security and interaction/integration with other processes/components.

2.4 Implement and test a solution in the form of a mock-up, a prototype, a lab or pilot module and/or a numerical model.

2.5 Come up with recommendations to improve the operationalisation of a solution under study.

3. organise and carry out a research project to understand a physical or chemical phenomenon or a new problem in materials engineering and science or chemical engineering (axis 3).

3.1 Document and summarize the existing body of knowledge in the area under consideration.

3.2 Propose a model and/or an experimental device in order to simulate and test hypotheses relating to the phenomenon under study.

3.3 Write a summary report that explains the potential of the theoretical or technical innovations 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 (axis 4).

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.
4.3 Work in a multidisciplinary environment with peers holding different points of view; manage any resulting disagreement or conflicts.
4.4 Make individual as well as team decisions when choices have to be made, whether they are about technical solutions or the division of labour to complete a project.

5. communicate effectively (orally or in writing) with the goal of carrying out assigned projects in the workplace. Ideally, the student should be able to communicate in one or more foreign languages in addition to his/her mother tongue (axis 5).

5.1 Clearly identify the needs of the client or the user: question, listen and understand all aspects of their request and not just the technical aspects.

5.2 Present arguments and adapt to the language of the interlocutors: technicians, colleagues, clients, superiors.

5.3 Communicate through graphs and diagrams: interpret a diagram, present project results, structure information.

5.4 Read and use different technical documents (rules, plans, specification notes).

5.5 Draft documents that take into account demands and conventions of the field.

5.6 Make a convincing oral presentation possibly using modern communication techniques.

6. demonstrate rigor, openness, critical thinking and a sense of ethics in your work. Using the technological and scientific innovations at your disposal, validate the socio-technical relevance of a hypothesis or a solution and act responsibly (axis 6).

6.1 Apply the standards of your discipline (terminology, measurement units, quality, security and environmental standards).

6.2 Find solutions that go beyond strictly technical issues by considering sustainable development and the ethical aspects of a project (for example, “life cycle analysis” among others).

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 during the graduation project which requires the critical analysis of implemented techniques as well as research for the Master’s thesis.)

6.4 Evaluate oneself and independently develop necessary skills for “lifelong learning” in the field (this skill is most notably developed through projects requiring bibliographic research).

Programme structure

The Master’s degree programme consists of:
-a core curriculum (30 credits) including the graduation project (28 credits) and a religion course (2 credits);
-a professional focus (30 credits);
-one major;
-elective courses to round out the programme.

The overwhelming majority of courses is given in English (all courses with LMAPR2xxx designation and a large proportion of the courses organized by EPL), with assistance provided to French-speaking students (« French-friendly » approach).

The student MUST choose at least one major among the two proposed in chemistry and materials.

He/she is further ALLOWED to choose a major among the two proposed in Business management and creation.

Normally, professional focus courses are taken during the first annual unit and the graduation project during the last one. However, students may (depending on their project) take these courses in the 1st or 2nd annual unit as long as they have completed the course prerequisites. This is particularly the case for students who complete part of their education abroad (ERASMUS or MERCATOR exchange, FAME dual degree).

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 will replace them with other elective courses or activities that are in keeping with programme regulations.

Regardless of the focus, major /or elective courses selected, the Master’s degree programme will consist of minimum of 120 credits divided over two annual units. The first annual unit has to consist of a minimum of 60 credits, the second the number of credits needed to complete the Master’s degree.

The student will verify that he/she has obtained the minimum number of credits required for the approval of the diploma as well as for the approval of the major, in order to include them in the diploma supplement.

Programmes that respect the above rules will be submitted for approval to 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.

> Core courses for the Master's degree in chemical and materials engineering *[en-prog-2021-kima2m-tronc_commun]*

Liste au choix de finalités KIMA2M

> Professional Focus *[en-prog-2021-kima2m-lkima200s]*

> List of electives *[en-prog-2021-kima2m-options]*

Major in chemical and materials

> Major in chemical engineering *[en-prog-2021-kima2m-lkima221o]*
> Major in materials science and engineering *[en-prog-2021-kima2m-lkima222o]*
> Cours au choix disciplinaires *[en-prog-2021-kima2m-lkima237o]*

Options et cours au choix en connaissances socio-économiques

> Business risks and opportunities *[en-prog-2021-kima2m-lkima235o]*
> Major in small and medium sized business creation *[en-prog-2021-kima2m-lkima236o]*
> Cours au choix en connaissances socio-économiques *[en-prog-2021-kima2m-lkima200o]*

Others elective courses

> Other elective courses *[en-prog-2021-kima2m-lkima952o]*

KIMA2M Detailled programme

Programme by subject

CORE COURSES [27.0]

O Mandatory	⊠ Optional
△ Courses not taught during 2021-2022	⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022	Activity with requisites

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

						Year 1	2
O LKIMA2990	Graduation project/End of studies project			25 Credits	q1+q2		x
O 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.*		30h+15h	2 Credits	q1+q2	x	x

PROFESSIONAL FOCUS [30.0]

O Mandatory
⊠ Optional
△ Courses not taught during 2021-2022
⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022
Activity with requisites

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

Content:

						Year 1	Year 2
O LMAPR2001	Project "chemical & materials engineering for a sustainable future"	Juray De Wilde Pascal Jacques Alain Jonas Patricia Luis Alconero	45h+60h	10 Credits	q2	x	x
O LMAPR2013	Science and engineering of metals and ceramics	Pascal Jacques	30h+30h	5 Credits	q1	x	x
O LMAPR2019	Polymer Science and Engineering	Sophie Demoustier Alain Jonas (coord.) Evelyne Van Ruymbeke	45h+15h	5 Credits	q1	x	x
O LMAPR2231	Metallurgical and electrochemical processes	Joris Proost	30h +22.5h	5 Credits	q2	x	x
O LMAPR2430	Industrial processes for the production of base chemicals	Juray De Wilde	30h +22.5h	5 Credits	q1	x	x

OPTIONS

The student selects at least one option among those proposed in chemistry and materials

Major in chemical and materials

> Major in chemical engineering *[en-prog-2021-kima2m-lkima221o]*
> Major in materials science and engineering *[en-prog-2021-kima2m-lkima222o]*
> Cours au choix disciplinaires *[en-prog-2021-kima2m-lkima237o]*

Options et cours au choix en connaissances socio-économiques

> Business risks and opportunities *[en-prog-2021-kima2m-lkima235o]*
> Major in small and medium sized business creation *[en-prog-2021-kima2m-lkima236o]*
> Cours au choix en connaissances socio-économiques *[en-prog-2021-kima2m-lkima200o]*

Others elective courses

> Other elective courses *[en-prog-2021-kima2m-lkima952o]*

MAJOR IN CHEMICAL AND MATERIALS

MAJOR IN CHEMICAL ENGINEERING [15.0]

O Mandatory
⊠ Optional
△ Courses not taught during 2021-2022
⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022
Activity with requisites

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

Year
1 2

Content:

Required courses (15 credits)

LMAPR2118	Fluid-fluid separations	Patricia Luis Alconero Denis Mignon	30h +22.5h	5 Credits	q2	x	x
LMAPR2330	Reactor Design	Juray De Wilde	30h+30h	5 Credits	q2	x	x
LMAPR2647	Sustainable treatment of industrial and domestic waste: Fundamentals	Olivier Françoisse Patricia Luis Alconero Olivier Noiset Benoît Stenuit	30h+15h	5 Credits	q1	x	x

MAJOR IN MATERIALS SCIENCE AND ENGINEERING [15.0]

Mandatory
Courses not taught during 2021-2022
Periodic courses taught during 2021-2022
Optional
Periodic courses not taught during 2021-2022
Activity with requisites

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

Year
1 2

Content:

Required courses

LMAPR2014	Physics of Functional Materials	Xavier Gonze Luc Piraux Gian-Marco Rignanese	37.5h +22.5h	5 Credits	q1	x	x
LMAPR2481	Deformation and fracture of materials	Thomas Pardoen	30h+30h	5 Credits	q1	x	x
LMAPR2011	Molecules and materials analysis	Arnaud Delcorte Sophie Hermans	30h+30h	5 Credits	q1	x	x

Mandatory
Courses not taught during 2021-2022
Periodic courses taught during 2021-2022
Optional
Periodic courses not taught during 2021-2022
Activity with requisites

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

Year
1 2

Cours au choix disciplinaires

Cours au choix disciplinaires en génie des matériaux

LMAPR2016	Project in Polymer Science	Charles-André Fustin Alain Jonas	0h+45h	5 Credits	q2	x	x
LCHM2261	Polymer Chemistry and Physical Chemistry	Charles-André Fustin Jean-François Gohy Alain Jonas	45h+15h	5 Credits	q1	x	x
LMAPR2018	Rheology	Evelyne Van Ruymbeke	30h+30h	5 Credits	q2	x	x
LMAPR2420	High performance metallic materials	Pascal Jacques Aude Simar	30h+30h	5 Credits	q2 ⊕	x	x
LMAPR2672	Sintered materials and surface treatments	Jean-Pierre Erauw Pascal Jacques Joris Proost	30h+30h	5 Credits	q2 ⊘	x	x

						Year 1	Year 2
⊠ LMECA2860	Welding Science and Technology	Pascal Jacques Aude Simar	30h+30h	5 Credits	q1	x	x
⊠ LMAPR2141	Metals Processing and Recycling	Philippe Henry Joris Proost	30h+30h	5 Credits	q2	x	x
⊠ LMECA2640	Mechanics of composite materials	Issam Doghri	30h+30h	5 Credits	q2	x	x
⊠ LMECA2520	Calculation of planar structures	Issam Doghri	30h+30h	5 Credits	q2	x	x
⊠ LGCIV1022	Mechanics of structures	Pierre Latteur	30h+30h	5 Credits	q2	x	x
⊠ LMAPR2642	Crystallographic and microstructural characterisation of materials	Pascal Jacques	30h+30h	5 Credits	q2	x	x
⊠ LMAPR2631	Surface Analysis	Arnaud Delcorte Bernard Nysten	30h+15h	5 Credits	q2	x	x

Cours au choix disciplinaires en développement durable et environnement

⊠ LMAPR2020	Materials Selection	Bernard Nysten Thomas Pardoen	30h +22.5h	5 Credits	q2	x	x
⊠ LMAPR2483	Durability of materials	Laurent Delannay Thomas Pardoen	30h +22.5h	5 Credits	q2	x	x
⊠ LMAPR2021	Societal challenges with polymers	Karine Glinel Alain Jonas Evelyne Van Ruymbeke	30h +22.5h	5 Credits	q2 ⊕	x	x
⊠ LENVI2007	Renewable energy sources	Emmanuel De Jaeger Patrick Gerin (coord.) Hervé Jeanmart	45h+15h	4 Credits	q1	x	x
⊠ LENVI2101	Sociétés, populations, environnement, développement: problématiques et approches interdisciplinaires	Nathalie Frogneux Julie Hermesse Pierre-Joseph Laurent Caroline Nieberding Jean-Pierre Raskin Jean-Pascal Van Ypersele De Strihou (coord.)	45h	6 Credits	q1	x	x

Cours au choix disiplinaires en bio-& Nanotechnologies

⊠ LGBIO2030	Biomaterials	Sophie Demoustier Christine Dupont	30h+30h	5 Credits	q1	x	x
⊠ LBIR1355	Métabolisme microbien et synthèse de biomolécules	Michel Ghislain (coord.) Yvan Larondelle	22.5h +15h	3 Credits	q2	x	x
⊠ LELEC2560	Micro and Nanofabrication Techniques	Laurent Francis (coord.) Benoît Hackens Jean-Pierre Raskin	30h+30h	5 Credits	q2	x	x
⊠ LMAPR2012	Macromolecular Nanotechnology	Sophie Demoustier Karine Glinel Jean-François Gohy Bernard Nysten	45h+15h	5 Credits	q2	x	x
⊠ LBIRC2108	Biochemical and Microbial Engineering		30h +22.5h	5 Credits	q2	x	x
⊠ LGBIO2020	Bioinstrumentation	André Mouraux Michel Verleysen	30h+30h	5 Credits	q1	x	x
⊠ LGBIO1114	Artificial organs and rehabilitation	Luc-Marie Jacquet Philippe Lefèvre Renaud Ronsse	30h+30h	5 Credits	q2 △	x	x
⊠ LMAPR2015	Physics of Nanostructures	Jean-Christophe Charlier (coord.) Xavier Gonze Luc Piraux	37.5h +22.5h	5 Credits	q1	x	x
⊠ LMAPR2451	Atomistic and nanoscopic simulations	Jean-Christophe Charlier Xavier Gonze Gian-Marco Rignanese	30h+30h	5 Credits	q2	x	x
⊠ LMAPR2471	Transport phenomena in solids and nanostructures	Jean-Christophe Charlier Luc Piraux	30h+30h	5 Credits	q2	x	x
⊠ LELEC2541	Advanced Transistors	Denis Flandre Benoît Hackens Jean-Pierre Raskin	30h +22.5h	5 Credits	q2	x	x

						Year 1	2
⊠ LELEC2550	Special electronic devices	Vincent Bayot	30h+15h	5 Credits	q1	x	x
⊠ LELEC2710	Nanoelectronics	Vincent Bayot (coord.) Benoît Hackens	30h+30h	5 Credits	q1	x	x
⊠ LELEC2895	Design of micro and nanosystems	Laurent Francis	30h+30h	5 Credits	q1	x	x
⊠ LCHM2170	Introduction to protein biotechnology	Pierre Morsomme Patrice Soumillion	22.5h +7.5h	3 Credits	q1	x	x
⊠ LBIRC2101	Biochemical analysis	François Chaumont Pierre Morsomme (coord.)	22.5h +30h	4 Credits	q1	x	x

Cours au choix disciplinaires en génie chimique

⊠ LINMA1510	Linear Control		30h+30h	5 Credits	q1	x	x
⊠ LINMA2300	Analysis and control of distributed parameter systems		30h+30h	5 Credits	q1 △	x	x
⊠ LMAPR2320	Advanced Reactor and Separation Technologies for the Production of Base Chemicals and Polymers	Juray De Wilde Patricia Luis Alconero Denis Mignon	30h+15h	5 Credits	q1	x	x
⊠ LMAPR2380	Solid-fluid separation	Tom Leyssens Patricia Luis Alconero	30h +22.5h	5 Credits	q1	x	x
⊠ LMAPR2691	Technology of chemical and environmental engineering	Patricia Luis Alconero Grégoire Winckelmans	30h+15h	5 Credits	q2	x	x
⊠ LINMA1702	Optimization models and methods I	François Glineur	30h +22.5h	5 Credits	q2	x	x
⊠ LMECA2645	Major technological hazards in industrial activity.		30h	3 Credits	q2	x	x

OPTIONS ET COURS AU CHOIX EN CONNAISSANCES SOCIO-ÉCONOMIQUES

BUSINESS RISKS AND OPPORTUNITIES

O Mandatory	⊠ Optional
△ Courses not taught during 2021-2022	⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022	Activity with requisites

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

Content:

						Year 1	Year 2
O LEPL2211	Business issues introduction	Benoît Gailly	30h	3 Credits	q2	x	x
O LEPL2212	Financial performance indicators		30h+5h	4 Credits	q2	x	x
O LEPL2214	Law, Regulation and Legal Context	Vincent Cassiers	30h+5h	4 Credits	q1	x	x

O One course between

From 3 to 5 credits

⊠ LEPL2210	Ethics and ICT	Axel Gosseries Olivier Pereira	30h	3 Credits	q2	x	x
⊠ LLSMS2280	Business Ethics and Compliance Management	Carlos Desmet	30h	5 Credits	q1	x	x

O Cours de fondements en marketing

Les cours MLSMM2136 Tendances en Digital Marketing Ou MLSMM2134 E-comportement du consommateur sont optionnels suite à la réussite du cours MGEST1220 lors du premier bloc annuel.

O MGEST1220	Marketing	Nadia Sinigaglia	45h+20h	5 Credits	q1	x	
⊠ MLSMM2136	Trends in Digital Marketing	Ingrid Poncin	30h	5 Credits	q2		x
⊠ MLSMM2134	e-Consumer Behavior	Karine Charry	30h	5 Credits	q2		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

O Mandatory	⊠ Optional
△ Courses not taught during 2021-2022	⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022	Activity with requisites

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

O Content:

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

						Year 1	Year 2
O LCPME2001	Entrepreneurship Theory (in French)	Frank Janssen	30h+20h	5 Credits	q1	x	
O LCPME2002	Managerial, legal and economic aspects of the creation of a company (in French)	Yves De Cordt Marine Falize	30h+15h	5 Credits	q1	x	
O LCPME2003	Business plan of the creation of a company (in French) *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	30h+15h	5 Credits	q2		x
O LCPME2004	Advanced seminar on Entrepreneurship (in French)	Frank Janssen	30h+15h	5 Credits	q2	x	

⊠ Prerequisite CPME courses

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

O LCPME2000	Venture creation financement and management I	Yves De Rongé Olivier Giacomin	30h+15h	5 Credits	q1	x	

[3.0]

O Mandatory	⊠ Optional
△ Courses not taught during 2021-2022	⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022	Activity with requisites

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

O Content:

						Year 1	Year 2
⊠ LEPL2211	Business issues introduction	Benoît Gailly	30h	3 Credits	q2	x	x
⊠ LFSA2995	Company Internship	Dimitri Lederer Jean-Pierre Raskin	30h	10 Credits	q1+q2	x	x
⊠ LFSA2212	Innovation classes	Benoît Macq Jean-Pierre Raskin Benoît Raucent	30h+15h	5 Credits	q1	x	x

OTHERS ELECTIVE COURSES

OTHER ELECTIVE COURSES

O Mandatory	⊠ Optional
△ Courses not taught during 2021-2022	⊘ Periodic courses not taught during 2021-2022
⊕ Periodic courses taught during 2021-2022	Activity with requisites

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

O Content:

Les étudiant·es 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.)	30h	3 Credits	q1+q2	x	x
⊠ LALLE2501	Professional development seminar-German	Caroline Klein (coord.)	30h	5 Credits	q1+q2	x	x
⊠ LESPA2600	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	30h	3 Credits	q1	x	x
⊠ LESPA2601	Vocational Induction Seminar - Spanish (B2.2/C1)	Paula Lorente Fernandez (coord.)	30h	5 Credits	q1	x	x
⊠ LNEER2500	Seminar of Entry to professional life in Dutch - Intermediate level	Isabelle Demeulenaere (coord.) Marie-Laurence Lambrecht	30h	3 Credits	q1 or q2	x	x
⊠ LNEER2600	Seminar of entry to professional life in Dutch - Upper-Intermediate level	Isabelle Demeulenaere (coord.)	30h	3 Credits	q1 or q2	x	x

⊠ Group dynamics

						Year 1	Year 2
⊠ LEPL2351	Group dynamics - Q1		15h+30h	3 Credits	q1	x	x
⊠ LEPL2352	Group dynamics - Q2		15h+30h	3 Credits	q2	x	x

⊠ Autres UEs hors-EPL

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

Course prerequisites

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

The programme's courses and learning outcomes

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

KIMA2M - 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.

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. The student is supposed to have at least a B2 level in the European Framework of Reference. A certificate is required for the holders of a non-Belgian degree, see selection criteria of the access on the file.

University Bachelors

Diploma	Special Requirements	Access	Remarks
UCLouvain Bachelors			
Bachelor in engineering		Direct access	Students who have neither major nor minor in the field of their civil engineering Master's degree may have an adapted master programme.
Others Bachelors of the French speaking Community of Belgium			
Bachelor in engineering		Direct access	Students with a Bachelor's degree in engineering sciences who have not taken the equivalent of a minor in the field of their civil enginering master degree may have an adapted master programme.
Bachelors of the Dutch speaking Community of Belgium			
Bachelor in Engineering		Access with additional training	Students who have no specialisation in the field of their civil enginering master degree may have an adapted master programme with up to 60 additional credits.
Foreign Bachelors			
Bachelor in Engineering	Bachelor 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.
	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

Admission on the basis of a submitted dossier may be granted either directly or on the condition of completing additional coursework 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

A student with no major in applied chemistry and physics from UCL, nor any option deemed equivalent, shall submit an application to the Faculty of applied sciences, including a detailed past curriculum (courses and grades by year). Engineering Bachelors are exempted from this procedure, if they have a minor in applied chemistry and physics from UCL, or an option deemed equivalent. The Faculty, after consulting the Applied chemistry and physics diploma committee, will decide as to the applicant’s admissibility, pursuant to rules relative to links between degrees. Moreover, the Faculty can propose a customized curriculum, by drawing on the volume of elective courses of the KIMA curriculum and, if necessary, up to 15 additional credits. For some students (e.g. bachelors in industrial engineering), the Faculty might require an additional year of studies prior to the Master’s, corresponding to 60 credits of the major in applied chemistry and physics.

Teaching method

A variety of teaching methods

The teaching methods used in the Master's degree programme in chemical and materials engineering are in keeping with those used in 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. An important characteristic of the programme is the immersion of students in the research laboratories of the professors who teach in the programme (lab work, case studies, projects and theses), which allows students to learn cutting edge methods used in their field and to learn from the questioning process inherent in research. In addition, there is an optional 10 credit internship carried out over at least 9 months in a research centre or company that allows motivated students to get experience in the professional world.

Diverse learning situations

Students are exposed to a variety of pedagogies: lectures, projects, exercise and problem-solving sessions, case studies, experimental laboratories, computer simulations, educational software, internships in industry or research, factory visits, graduation trips, individual or group work, seminars given by visiting scientists. This variety of pedagogies helps 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.

Interdisciplinary Methods

The Master's degree in chemical and materials engineering is by its very nature interdisciplinary because it serves as an interface between chemistry and physics. It has an interdisciplinary foundation, which provides students with an introduction the large array of applications used in applied physics and chemistry and training through practical work and cutting edge research as well as major courses in chemistry and material technologies: polymers and macromolecules, inorganic materials and processes, materials mechanics, chemical engineering, nanotechnologies and environmentalism and sustainable development. The programme is open to biotechnology with majors in biomaterials and bioprocesses as well as to business management with majors in management and small and medium sized business creation. The programme is composed of a significant number of classes such as PHYS (or PHY), CHIM (or CHM), BIOL, INMA, MECA, ELEC, BRNA and BIR, which shows that the programme is open and interdisciplinary. Finally, the programme allows students to select up to 40 credits of elective courses from the medical and science programmes and up to 6 credits of classes in the humanities and social sciences, which allow students to create a personalised programme of study.

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. Details about evaluation methods for each teaching unit are explained by the professors at the beginning of the semester.

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

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

Accessible specialised Master's degrees

The Master's degree in nanotechnology and the Master's degree in nuclear engineering are natural extensions of the programme.

Accessible doctoral degrees

The Master's degree programme in chemistry and materials engineering also prepares students for doctoral programmes. Programme professors are members of doctoral programmes such as CHIM (molecular, supramolecular and functional chemistry), MAIN (materials, interfaces and nanotechnologies) and GEPROC (process engineering). These programmes are suitable for students who would like to continue their studies at the doctoral level.

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

- Président du Jury: Jean-Didier Legat
- Secrétaire du Jury: Pascal Jacques

Useful Contact(s)

- Secrétariat: Vinciane Gandibleux