

At Louvain-la-Neuve - 180 credits - 3 years - Day schedule - In FrenchDissertation/Graduation Project : **NO** - Internship : **YES**Activities in English: **YES** - Activities in other languages : **NO**Activities on other sites : **NO**Main study domain : **Sciences de l'ingénieur et technologie**Organized by: **Louvain School of Engineering (EPL)**Programme acronym: **FSA1BA** - Francophone Certification Framework: 6**Table of contents**

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FSA1BA - Introduction

Introduction

Introduction

After passing the admission test you will start your cursus with the bachelor's programme in Engineering Sciences [180]. This programme offers a basic science education and a specific training in Engineering sciences.

During the second annual unit, you will opt for two different trainings in specialized Polytechnics. These specialization tracks enable you to get acquainted with two specialties in Engineering Sciences and to prepare you for a specialized master. Seven different specialization tracks are available: Applied Chemistry and Physics, Construction, Electricity, Computer Sciences, Biomedical Engineering, Applied Mathematics and Mechanics.

The student has the possibility to replace one of these tracks by an accessible opening minor.

Your profile

Following a strong math and science education during high school is recommended.

Your future job

All industrial sectors need civil engineers: the chemical industry, pharmaceutical and food industries, electronics and telecommunications industries, metallurgy, aeronautics, construction and engineering, large scale distribution, banking and consulting services, nanotechnologies and medical technologies, etc.

They play a role as researchers and developers, are responsible for production or management and hold jobs in marketing and sales (of advanced technological products).

We find civil engineers in departments of finance, information technology, training or quality control, the public sector, higher education, or in the Ministry of equipment and transportation. (www.fabi.be)

Your programme

The programme offers :

- a strong scientific education in : mathematics, physics, chemistry, computer science, numerical computation, probabilities and statistics, ...
- a problem-based learning in small groups
- a training in concrete problem analyzing, looking for missing items, and developing your own solutions
- engineering projects management, from the conception to completion
- high-level skills: analysis, critical thinking, communication, team working, conception in a multidisciplinary context.

Once bachelor, you will continue your training by one of the following Masters: Biomedical Engineering, Chemical and Materials Engineering, Civil Engineering, Computer science, Data Sciences Engineering, Physical Engineering, Mechanical Engineering, Electrical Engineering, Electro-mechanical Engineering, Mathematical Engineering.

FSA1BA - Teaching profile

Learning outcomes

General objectives

The bachelor's programme in Engineering Sciences : Engineering, leads to the degree of "Bachelor of Engineering Sciences : Engineering" of the French-speaking Community of Belgium. Upon successful completion of this first cycle of studies, the student will have access to one or several titles in Engineering Sciences, awarded by the Faculty of Applied Sciences, by doing one of the corresponding master's programmes.

The general objectives of the bachelor's programme in Engineering Sciences are, therefore, aimed at the acquisition of :

- lasting scientific knowledge : a solid grounding in the sciences as well as the practice and integration of previously acquired knowledge
- a solid basis in specialised studies, entitling access to a master's (either at UCL, within the French-speaking Community or abroad) : progressive orientation, one or two specialisations in Engineering Sciences
- high level competence and skills : analysis, critical spirit, self-evaluation, conception (of models, tools, systems, processes and procedures), sound written and oral communication skills and professional team-work qualities. The programme is designed to integrate the necessary skills within a pluridisciplinary context (including the Human Sciences, Ethics, the Environment and Sustainable Development).

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

démontrer la maîtrise d'un corpus de connaissances en sciences fondamentales et polytechniques, lui permettant de résoudre des problématiques disciplinaires cadrées (Axe 1).

1.1. Appliquer les concepts, lois, raisonnements à une problématique disciplinaire de complexité cadrée.

1.2. Décrire des outils de modélisation et de calcul adéquats pour résoudre une problématique disciplinaire cadrée.

d'organiser et de mener à son terme une démarche d'ingénierie appliquée au développement d'un produit (et/ou d'un service) répondant à un besoin ou à une problématique cadrée, à l'analyse d'un phénomène physique donné, un système (Axes 2 et 3).

2.1. Décrire et formuler le problème à résoudre ou le besoin fonctionnel sous la forme d'un cahier des charges générique.

2.2. Se documenter sur l'état des connaissances actuelles dans le domaine de la problématique posée.

2.3. Poser des hypothèses de travail pour la modélisation d'une problématique cadrée.

2.4. Modéliser un problème et concevoir une ou plusieurs solutions techniques répondant au cahier des charges.

2.5. Implémenter et tester une solution sous la forme d'une maquette, d'un prototype et/ou d'un modèle numérique.

2.6. Synthétiser en vue d'expliciter : les hypothèses, la modélisation et la solution proposée.

2.7. Porter un regard critique sur des hypothèses prises et sur la pertinence des solutions (autoévaluation individuelle).

2.8. Formuler des recommandations pour améliorer la solution étudiée, le système analysé.

de contribuer, en équipe, à la réalisation d'un **projet disciplinaire ou pluridisciplinaire** en respectant une approche cadrée.

3.1. Etablir et s'engager collectivement sur un plan de travail, un échéancier, des fonctions et des rôles, s'y engager, pour mettre en oeuvre des tâches du projet.

3.2. S'autoévaluer de manière critique, continue et collaborative en vue de fonctionner efficacement en équipe.

de communiquer efficacement oralement et par écrit les résultats des missions qui lui sont confiés. Il sera capable communiquer en anglais en plus du français.

4.1. Argumenter et convaincre au sein de l'équipe et vis-à-vis des enseignants et des jurys.

4.2. Communiquer sous forme graphique et schématique ; interpréter un schéma, présenter les résultats d'un travail, structurer des informations.

4.3. Lire, analyser et exploiter des documents techniques (normes, plans, cahier de charge, spécifications, ...).

4.4. Rédiger des documents écrits de synthèse en tenant compte des exigences posées dans le cadre des missions (projets et problèmes).

4.5. Faire un exposé oral convaincant en utilisant les techniques modernes de communication.

de faire preuve de rigueur et d'esprit critique dans ses démarches scientifiques et techniques en **se souciant de l'éthique**.

5.1 Utiliser des ressources bibliographiques pour réaliser et argumenter un travail, en tenant compte des règles éthiques.

5.2 Intégrer dans une démarche d'ingénierie des préoccupations sociétales, éthiques et environnementales.

Programme structure

The bachelor's programme in Engineering Sciences: Engineering, includes 180 credits spread over 3 years:

- A basic science education of 120 credits,
- Two specializations of 30 credits (one of these specialization tracks can be replaced by an opening minor in another Faculty).

The student opts for two specialized trainings in engineering. The aim of this double specialization track is to enable the student to acquire a basic training in two specialties in Engineering Sciences, thus increasing his technical polyvalence, or to prepare for a master in Engineering Sciences situated mid-way between these minors. The workload is separated in two parts: 10 credits in the second annual programme and 20 credits in the third annual programme.

The student has the possibility to replace one of the specialization tracks by [an accessible opening minor](#).

The seven different specialization tracks in Engineering Sciences are :

- 1. Biomedical Engineering:** The aim of this track is initiating the students to the multidisciplinary field of biomedical engineering. First, this requires an introduction to the different disciplines of life sciences (biology, anatomy, biochemistry, etc.). Next, a familiarization with fundamental challenges from the different pillars of biomedical engineering will be provided (bioinstrumentation, biomaterials, biomechanics, artificial organs, medical imaging, biological systems modeling, etc.). The students will then be able to deploy these skills in order to solve basic problems in biomedical engineering.
- 2. Civil Engineering:** The aim of this track is initiating the students to the basic concepts of civil engineering. In addition to the theoretical fundamentals about structures, materials, soil mechanics and hydraulics, the students will be immersed in the "civil engineering culture" and will acquire concrete experience by practical and laboratory works, basic projects and site visits.
- 3. Electricity:** The aim of this track is initiating the students to the basic concepts of electrical sciences and providing them the fundamental notions in the scientific and technical fields linked to electricity and its applications. More precisely the students will discover the fundamentals of electromagnetics and physical phenomena forming the basis of electronic devices working ; as well as the basic concepts of electronics, telecommunications, and electrodynamic converters.
- 4. Mechanics:** The aim of this track is to enable the students to increase and broaden their knowledge and skills in different areas of Mechanical Engineering. More specifically, this programme offers the students the opportunity to build a solid background knowledge of continuum mechanics (fluid and solid mechanics) and thermodynamics, both from the theoretical and the applied standpoints. Further, it offers applied but rigorous training in machine design, analysis of machine components and manufacturing. Finally, this programme allows the students to develop a strong expertise in mathematical modelling and methods for numerical simulation.
- 5. Computer science:** The aim of this track is to enable the students to master the basic concepts in the field of computer sciences. More precisely this specialization trains the students to acquire basic fundamentals in computer sciences (algorithmic and data structures, computer languages, informatic systems, databases); and the capacity to analyze and solve algorithmic problems by applying its knowledge in the field of computer and engineering sciences.
- 6. Applied Mathematics:** The aim of this track is to enable the students to increase and improve their knowledge and skills in various fields of applied mathematics and to understand their basic concepts. More precisely this specialization trains the students in the design, analysis and implementation of mathematical models for engineering sciences in the industry, and in the elaboration of effective strategies to optimise their performance.
- 7. Applied Chemical and Physics:** The aim of this track is to enable the students to build a broad knowledge skills base in applied chemistry and physics (including thermodynamics and kinetics) opening avenues to the main fields of chemical and environmental engineering, advanced materials engineering, as well as physical engineering. The acquired skills cover a wide range of physical scales, from atomic to macroscopic and industrial dimensions, and prepare to the professions of the engineering master in chemistry and materials science swell as the master in physical engineering (chemical and environmental engineering, sustainable chemistry and energy, nanotechnology, (nano)electronics, optics, advanced materials including biomaterials, sensors and transducers, etc.).

FSA1BA Programme

Detailed programme by subject

- Mandatory
- ⊗ Optional
- △ Not offered in 2021-2022
- ⊙ Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2 3

○ **Obligatory Courses (120 credits)**

○ **General Courses (120 credits)**

All the students attend all these courses.

				Year		
				1	2	3
○ LEPL1101	Algebra	François Glineur Raphaël Jungers Jean-François Remacle Michel Verleysen (coord.)	FB [q1] [30h+30h] [5 Credits]	x		
○ LEPL1102	Analysis I	François Glineur (coord.) Raphaël Jungers Jean-François Remacle Michel Verleysen	FB [q1] [30h+30h] [5 Credits]	x		
○ LEPL1201	Physics I	Roland Keunings Jean-Didier Legat	FB [q1] [30h+30h] [5 Credits]	x		
○ LEPL1501	Project 1	Xavier Bollen (compensates Benoît Raucent) Charles Pecheur Sandra Soares Frazao	FB [q1] [30h+30h] [5 Credits]	x		
○ LEPL1401	Informatics 1	Kim Mens Siegfried Nijssen Charles Pecheur	FB [q1] [30h+30h] [5 Credits]	x		
○ LEPL1103	EDPs and complex analysis 🟡	Philippe Chatelain Julien Hendrickx Grégoire Winckelmans (coord.)	FB [q1] [30h+30h] [5 Credits]		x	
○ LEPL1104	Numerical methods	Vincent Legat	FB [q2] [30h+30h] [5 Credits]	x		
○ LEPL1105	Analysis II	François Glineur Roland Keunings	FB [q2] [30h+30h] [5 Credits]	x		
○ LEPL1106	Signals and systems 🟡	Julien Hendrickx Luc Vandendorpe	FB [q2] [30h+30h] [5 Credits]		x	
○ LEPL1202	Physics II	Paul Fissette Claude Oestges	FB [q2] [30h+30h] [5 Credits]	x		
○ LEPL1203	Physics III 🟡	Jean-Christophe Charlier Jérôme Louveaux Claude Oestges (coord.)	FB [q1] [30h+30h] [5 Credits]		x	
○ LEPL1108	Discrete mathematics and probability	Jean-Charles Delvenne Olivier Pereira	FB [q1] [30h+30h] [5 Credits]		x	
○ LEPL1109	Statistics and data sciences 🟡	Donatien Hainaut Laurent Jacques	FB [q1] [30h+30h] [5 Credits]			x
○ LEPL1110	Finished elements 🟡	Vincent Legat Jean-François Remacle	FB [q2] [30h+30h] [5 Credits]			x
○ LEPL1502	Project 2	David Bol Jérôme Louveaux Claude Oestges (coord.)	FB [q2] [30h+30h] [5 Credits]	x		
○ LEPL1503	Project 3 🟡	Olivier Bonaventure (coord.) Axel Legay	FB [q2] [30h+30h] [5 Credits]		x	
○ LEPL1301	Chemistry and Physical chemistry 1	Francesco Contino Sophie Demoustier Bernard Nysten	FB [q2] [30h+30h] [5 Credits]	x		
○ LEPL1302	Chemistry and Physical chemistry 2 🟡	Hervé Jeanmart Joris Proost	FB [q1] [30h+30h] [5 Credits]		x	
○ LEPL1402	Informatics 2 🟡	Sébastien Jodogne Ramin Sadre Pierre Schaus	FB [q1] [30h+30h] [5 Credits]		x	

○ Non-disciplinary Courses

○ Cours au choix (3 credits)

Les étudiants choisissent un cours parmi

⌘ LEPL1804	Sustainable development and transition	David Bol Hervé Jeanmart Patricia Luis Alconero Xavier Marichal Jean-Pierre Raskin	FB [q1] [22.5h+15h] [3 Credits]			x
⌘ LEPL1805	People management	Bauduin Auquier Philippe Henrotaux Renaud Ronsse	FB [q1] [22.5h+15h] [3 Credits]			x

○ Cours obligatoires (8 credits)

The students attend these two courses

○ LEPL1801	Engineering ethics	Alexandre Guay	FR [q1] [22.5h+15h] [3 Credits]	X		
○ LEPL1803	Economy	Jacqueline Boucher Julien Hendrickx	FR [q2] [30h+30h] [5 Credits]	X		

○ 3rd annual unit project

The students choose a project (corresponding to one of their specialization tracks) between:

⊗ LEPL1504	Project 4 (in mechanics) 🟡	Nicolas Docquier Paul Fiset	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LEPL1505	Project 4 (in chemistry and physics)	Pascal Jacques (compensates) Thomas Pardoën Bernard Nysten	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LEPL1506	Project 4 (in biomedical engineering) 🟡	Philippe Lefèvre	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LEPL1507	Project 4 (in applied mathematics)	Julien Hendrickx Anthony Papavasiliou	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LEPL1508	Project 4 (in electricity) 🟡	Christophe Craeye (coord.) Claude Oestges Luc Vandendorpe	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LEPL1509	Project 4 (in informatics) 🟡	Marc Lainez (compensates) Yves Deville	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LEPL1510	Project 4 (in construction)	Pierre Latteur	FR [q2] [30h+22.5h] [5 Credits]			X
⊗ LSST1001	IngénieursSud	Stéphanie Merle Jean-Pierre Raskin (coord.)	FR [q1+q2] [15h+45h] [5 Credits]			X

○ Language Courses (7 credits)**○ English courses (7 credits)**

A placement test is organized at the beginning of the annual unit 1 and 2. Depending on the obtained mark, the students follow an adapted course. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language course (out of the 180 credits); this additional course will only affect their average mark if credited (mark greater or equal to 10/20)

○ LANGL1171	Anglais pour ingénieurs civils I	Ilenia Gallo Hila Peer (compensates) Marielle Henriët Marc Piwnik Nevin Serbest (coord.) Anne-Julie Toubeau (coord.)	EN [q1] [12h] [2 Credits]	X		
○ LANGL1272	Anglais pour ingénieurs civils II	Stéphanie Brabant Jérémy Dupal Nicholas Gibbs Charlotte Peters (coord.) Marc Piwnik (coord.) Nevin Serbest	EN [q1] [30h] [3 Credits]		X	
○ LANGL1373	Anglais pour ingénieurs civils III	Ahmed Adrieueche (coord.) Catherine Avery Charlotte Diaz Nicholas Gibbs Hila Peer Charlotte Peters (coord.) Adrien Pham Nevin Serbest Françoise Stas Marie Van Reet	EN [q1] [30h] [2 Credits]			X

⊗ Dutch courses

⊗ LNEER1300	General and academic Dutch - intermediate level	Hilde Bufkens (coord.)	NL [q1 or q2] [30h] [2 Credits]	X		
⊗ LNEER1500	Interfaculty teaching unit - General and academic Dutch - upper-intermediate level	Hilde Bufkens (coord.) Valérie Dachy	NL [q1] [30h] [3 Credits]			X

⊗ German courses

				Year		
				1	2	3
☒ LALLE1100	German - Elementary level	Caroline Klein Ann Rinder (coord.)	DE [q1+q2] [90h] [2 Credits]	x		
☒ LALLE1300	General German – independent user – threshold	Virginie Godin (coord.) Joy Picrit (compensates Virginie Godin)	DE [q1+q2] [90h] [3 Credits]		x	
☒ LALLE1500	General German – independent user – vantage	Virginie Godin (coord.) Joy Picrit (compensates Virginie Godin)	DE [q1+q2] [90h] [2 Credits]			x

☒ Spanish Courses

☒ LESP1100	Spanish (beginner's level) 0-A2		ES [q1+q2] [90h] [2 Credits] Δ	x		
☒ LESP1300	spanish middle level		ES [q1+q2] [90h] [3 Credits] Δ		x	
☒ LESP1500	Spanish Advanced level (B1.2 , B2.1)	Alicia Maria Tirado Fernandez (compensates Carmen Vallejo Villamor)	ES [q1] [45h] [2 Credits]			x
☒ LESP1101	Spanish beginner's level 1st part (0-A1)	Begona Garcia Migura Juan Landa Diestro Alicia Maria Tirado Fernandez Carmen Vallejo Villamor (coord.)	ES [q1 or q2] [45h] [2 Credits]			x

☒ Other language courses

The student could propose a course in another language.

○ Religion courses for students in exact sciences (2 credits)

The students select one course between:

☒ LTECO2100	Sociétés, cultures, religions : Biblical readings	Hans Ausloos	FR [q1] [15h] [2 Credits]			x
☒ LTECO2300	Societies, cultures, religions : Ethical questions	Marcela Lobo Bustamante	FR [q1] [15h] [2 Credits]			x
☒ LTSEO2840	Science and Christian faith	Benoît Bourguine Dominique Lambert	FR [q1] [15h] [2 Credits]			x
☒ LTECO2200	Societies-cultures-religions : Human Questions	Sébastien Dehorter (compensates Régis Burnet) Dominique Martens	FR [q1 or q2] [15h] [2 Credits]			x

○ Minor or additional module (30 credits)

List of available minors

The student can choose to replace one of his-her specialization tracks by a non-polytechnic opening minor. The list of accessible minors is below. The choice has to be made before the beginning of the second annual unit.

- > [Minor in Law \(access\)](#) [en-prog-2021-minadroi]
- > [Minor in Urban Architecture](#) [en-prog-2021-minarch]
- > [Minor in Information and Communication](#) [en-prog-2021-mincomu]
- > [Minor in Culture and Creation](#) [en-prog-2021-mincucrea]
- > [Minor in Scientific Culture](#) [en-prog-2021-mincults]
- > [Minor in Development and Environment](#) [en-prog-2021-mindenv]
- > [Minor in Sustainable Development \(*\)](#) [en-prog-2021-mindd]
- > [Minor in Economics](#) [en-prog-2021-minecon]
- > [Specialization track in Electricity](#) [en-prog-2021-filelec]
- > [Minor in European Studies](#) [en-prog-2021-mineuro]
- > [Specialization track in applied Chemistry and Physics](#) [en-prog-2021-filfyki]
- > [Specialization track in Biomedical Engineering](#) [en-prog-2021-filgbio]
- > [Specialization track in Construction](#) [en-prog-2021-filgce]
- > [Minor in Gender Studies](#) [en-prog-2021-mingenre]
- > [Minor in Geography](#) [en-prog-2021-mingeog]
- > [Minor in Management \(basic knowledge\)](#) [en-prog-2021-minogest]
- > [Minor in Human and Social Sciences](#) [en-prog-2021-minhuso]
- > [Specialization track in Computer Science](#) [en-prog-2021-filinfo]
- > [Minor in Philosophy](#) [en-prog-2021-minfilo]
- > [Minor in Literary Studies](#) [en-prog-2021-minlitt]
- > [Specialization track in Applied Mathematics](#) [en-prog-2021-filmap]
- > [Minor in Mathematics](#) [en-prog-2021-minmath]
- > [Specialization track in Mechanics](#) [en-prog-2021-filmeca]
- > [Minor in entrepreneurship \(*\)](#) [en-prog-2021-minmpme]
- > [Minor in Musicology](#) [en-prog-2021-minmusi]
- > [Minor in Law \(openness\)](#) [en-prog-2021-minodroi]
- > [Minor in Physics](#) [en-prog-2021-minphys]
- > [Minor in Statistics, Actuarial Sciences and Data Sciences](#) [en-prog-2021-minstat]

(*) *This programme is the subject of access criteria*

Course prerequisites

The **table** below lists the activities (course units, or CUs) for which there are one or more prerequisites within the programme, i.e. the programme CU for which the learning outcomes must be certified and the corresponding credits awarded by the jury before registering for that CU.

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

Prerequisites and student's annual programme

As the prerequisite is for CU registration purposes only, there are no prerequisites within a programme year. Prerequisites are defined between CUs of different years and therefore influence the order in which the student will be able to register for the programme's CUs.

In addition, when the jury validates a student's individual programme at the beginning of the year, it ensures its coherence, meaning that it may:

- transform a prerequisite into a corequisite within the same year (to enable the student to continue his or her studies with a sufficient annual course load)
- require the student to combine registration in two separate CUs which it considers necessary from a pedagogical point of view.

For more information, please consult the [Academic Regulations and Procedures](#).

Prerequisites list

LEPL1103	"EDPs et analyse complexe" has prerequisite(s) LEPL1102 ET LEPL1105 <ul style="list-style-type: none"> • LEPL1102 - Analysis I • LEPL1105 - Analysis II
LEPL1106	"Signaux et systèmes" has prerequisite(s) LEPL1101 ET LEPL1102 ET LEPL1105 <ul style="list-style-type: none"> • LEPL1101 - Algebra • LEPL1102 - Analysis I • LEPL1105 - Analysis II
LEPL1109	"Statistiques et science des données" has prerequisite(s) LEPL1108 <ul style="list-style-type: none"> • LEPL1108 - Discrete mathematics and probability
LEPL1110	"Éléments finis" has prerequisite(s) LEPL1104 <ul style="list-style-type: none"> • LEPL1104 - Numerical methods
LEPL1203	"Physique III" has prerequisite(s) LEPL1201 ET LEPL1202 <ul style="list-style-type: none"> • LEPL1201 - Physics I • LEPL1202 - Physics II
LEPL1302	"Chimie et chimie physique 2" has prerequisite(s) LEPL1301 <ul style="list-style-type: none"> • LEPL1301 - Chemistry and Physical chemistry 1
LEPL1402	"Informatique 2" has prerequisite(s) LEPL1401 <ul style="list-style-type: none"> • LEPL1401 - Informatics 1
LEPL1503	"Projet 3" has prerequisite(s) LEPL1401 <ul style="list-style-type: none"> • LEPL1401 - Informatics 1
LEPL1504	"Projet 4 (en mécanique)" has prerequisite(s) LEPL1104 ET LEPL1202 ET LEPL1503 <ul style="list-style-type: none"> • LEPL1104 - Numerical methods • LEPL1202 - Physics II • LEPL1503 - Project 3
LEPL1506	"Projet 4 (en génie biomédical)" has prerequisite(s) LEPL1104 ET LEPL1106 <ul style="list-style-type: none"> • LEPL1104 - Numerical methods • LEPL1106 - Signals and systems
LEPL1508	"Projet 4 (en électricité)" has prerequisite(s) LEPL1106 <ul style="list-style-type: none"> • LEPL1106 - Signals and systems
LEPL1509	"Projet 4 (en informatique)" has prerequisite(s) LEPL1402 <ul style="list-style-type: none"> • LEPL1402 - Informatics 2

The programme's courses and learning outcomes

For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies 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.

Detailed programme per annual block

FSA1BA - 1ST ANNUAL UNIT

- Mandatory
- ⊗ Optional
- △ Not offered in 2021-2022
- ⊙ Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

○ Obligatory Courses

○ General Courses

All the students attend all these courses.

○ LEPL1101	Algebra	François Glineur Raphaël Jungers Jean-François Remacle Michel Verleysen (coord.)	[FR] [q1] [30h+30h] [5 Credits]
○ LEPL1102	Analysis I	François Glineur (coord.) Raphaël Jungers Jean-François Remacle Michel Verleysen	[FR] [q1] [30h+30h] [5 Credits]
○ LEPL1201	Physics I	Roland Keunings Jean-Didier Legat	[FR] [q1] [30h+30h] [5 Credits]
○ LEPL1501	Project 1	Xavier Bollen (compensates Benoît Raucen) Charles Pecheur Sandra Soares Frazao	[FR] [q1] [30h+30h] [5 Credits]
○ LEPL1401	Informatics 1	Kim Mens Siegfried Nijssen Charles Pecheur	[FR] [q1] [30h+30h] [5 Credits]
○ LEPL1104	Numerical methods	Vincent Legat	[FR] [q2] [30h+30h] [5 Credits]
○ LEPL1105	Analysis II	François Glineur Roland Keunings	[FR] [q2] [30h+30h] [5 Credits]
○ LEPL1202	Physics II	Paul Fisette Claude Oestges	[FR] [q2] [30h+30h] [5 Credits]
○ LEPL1502	Project 2	David Bol Jérôme Louveaux Claude Oestges (coord.)	[FR] [q2] [30h+30h] [5 Credits]
○ LEPL1301	Chemistry and Physical chemistry 1	Francesco Contino Sophie Demoustier Bernard Nysten	[FR] [q2] [30h+30h] [5 Credits]

○ Non-disciplinary Courses

○ Cours obligatoires

The students attend these two courses

○ LEPL1801	Engineering ethics	Alexandre Guay	[FR] [q1] [22.5h +15h] [3 Credits]
○ LEPL1803	Economy	Jacqueline Boucher Julien Hendrickx	[FR] [q2] [30h+30h] [5 Credits]

○ Language Courses

○ English courses

A placement test is organized at the beginning of the annual unit 1 and 2. Depending on the obtained mark, the students follow an adapted course. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language course (out of the 180 credits); this additional course will only affect their average mark if credited (mark greater or equal to 10/20)

○ LANGL1171	Anglais pour ingénieurs civils I	Ilenia Gallo Hila Peer (compensates) Marielle Henriët Marc Piwnik Nevin Serbest (coord.) Anne-Julie Toubeau (coord.)	ES [q1] [12h] [2 Credits]
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⊗ Dutch courses

⊗ LNEER1300	General and academic Dutch - intermediate level	Hiide Bufkens (coord.)	NE [q1 or q2] [30h] [2 Credits]
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⊗ German courses

⊗ LALLE1100	German - Elementary level	Caroline Klein Ann Rinder (coord.)	DE [q1+q2] [90h] [2 Credits]
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⊗ Spanish Courses

⊗ LESPA1100	Spanish (beginner's level) 0-A2		ES [q1+q2] [90h] [2 Credits] Δ
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FSA1BA - 2ND ANNUAL UNIT

- Mandatory
- ⊗ Optional
- △ Not offered in 2021-2022
- ⊖ Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

o Obligatory Courses

o General Courses

All the students attend all these courses.

○ LEPL1103	EDPs and complex analysis ■	Philippe Chatelain Julien Hendrickx Grégoire Winckelmans (coord.)	FR [q1] [30h+30h] [5 Credits]
○ LEPL1106	Signals and systems ■	Julien Hendrickx Luc Vandendorpe	FR [q2] [30h+30h] [5 Credits]
○ LEPL1203	Physics III ■	Jean-Christophe Charlier Jérôme Louveaux Claude Oestges (coord.)	FR [q1] [30h+30h] [5 Credits]
○ LEPL1108	Discrete mathematics and probability	Jean-Charles Delvenne Olivier Pereira	FR [q1] [30h+30h] [5 Credits]
○ LEPL1503	Project 3 ■	Olivier Bonaventure (coord.) Axel Legay	FR [q2] [30h+30h] [5 Credits]
○ LEPL1302	Chemistry and Physical chemistry 2 ■	Hervé Jeanmart Joris Proost	FR [q1] [30h+30h] [5 Credits]
○ LEPL1402	Informatics 2 ■	Sébastien Jodogne Ramin Sadre Pierre Schaus	FR [q1] [30h+30h] [5 Credits]

o Language Courses

o English courses

A placement test is organized at the beginning of the annual unit 1 and 2. Depending on the obtained mark, the students follow an adapted course. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language course (out of the 180 credits); this additional course will only affect their average mark if credited (mark greater or equal to 10/20)

○ LANGL1272	Anglais pour ingénieurs civils II	Stéphanie Brabant Jérémy Dupal Nicholas Gibbs Charlotte Peters (coord.) Marc Piwnik (coord.) Nevin Serbest	FR [q1] [30h] [3 Credits]
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⊗ Dutch courses

⊗ LNEER1500	Interfaculty teaching unit - General and academic Dutch - upper-intermediate level	Hilde Bufkens (coord.) Valérie Dachy	NL [q1] [30h] [3 Credits]
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⊗ German courses

⊗ LALLE1300	General German – independent user – threshold	Virginie Godin (coord.) Joy Picrit (compensates) Virginie Godin	DE [q1+q2] [90h] [3 Credits]
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⊗ Spanish Courses

⊗ LESP1300	spanish middle level		ES [q1+q2] [90h] [3 Credits] △
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o Religion courses for students in exact sciences*The students select one course between:*

⌘ LTECO2100	Sociétés, cultures, religions : Biblical readings	Hans Ausloos	FB [q1] [15h] [2 Credits]
⌘ LTECO2300	Societies, cultures, religions : Ethical questions	Marcela Lobo Bustamante	FB [q1] [15h] [2 Credits]
⌘ LTHEO2840	Science and Christian faith	Benoît Bourguine Dominique Lambert	FB [q1] [15h] [2 Credits]
⌘ LTECO2200	Societies-cultures-religions : Human Questions	Sébastien Dehorter (compensates Régis Burnet) Dominique Martens	FB [q1 or q2] [15h] [2 Credits]

o Minor or additional module

FSA1BA - 3RD ANNUAL UNIT

- Mandatory
- ⊗ Optional
- △ Not offered in 2021-2022
- ⊖ Not offered in 2021-2022 but offered the following year
- ⊕ Offered in 2021-2022 but not the following year
- △ ⊕ Not offered in 2021-2022 or the following year
- Activity with requisites
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

○ Obligatory Courses

○ General Courses

All the students attend all these courses.

○ LEPL1109	Statistics and data sciences ■	Donatien Hainaut Laurent Jacques	FR [q1] [30h+30h] [5 Credits]
○ LEPL1110	Finished elements ■	Vincent Legat Jean-François Remacle	FR [q2] [30h+30h] [5 Credits]

○ Non-disciplinary Courses

○ Cours au choix

Les étudiants choisissent un cours parmi

⊗ LEPL1804	Sustainable development and transition	David Bol Hervé Jeanmart Patricia Luis Alconero Xavier Marichal Jean-Pierre Raskin	FR [q1] [22.5h +15h] [3 Credits]
⊗ LEPL1805	People management	Bauduin Auquier Philippe Henrotaux Renaud Ronsse	FR [q1] [22.5h +15h] [3 Credits]

○ 3rd annual unit project

The students choose a project (corresponding to one of their specialization tracks) between:

⊗ LEPL1504	Project 4 (in mechanics) ■	Nicolas Docquier Paul Fisette	FR [q2] [30h +22.5h] [5 Credits]
⊗ LEPL1505	Project 4 (in chemistry and physics)	Pascal Jacques (compensates) Thomas Pardoën Bernard Nysten	FR [q2] [30h +22.5h] [5 Credits]
⊗ LEPL1506	Project 4 (in biomedical engineering) ■	Philippe Lefèvre	FR [q2] [30h +22.5h] [5 Credits]
⊗ LEPL1507	Project 4 (in applied mathematics)	Julien Hendrickx Anthony Papavasiliou	FR [q2] [30h +22.5h] [5 Credits]
⊗ LEPL1508	Project 4 (in electricity) ■	Christophe Craeye (coord.) Claude Oestges Luc Vandendorpe	FR [q2] [30h +22.5h] [5 Credits]
⊗ LEPL1509	Project 4 (in informatics) ■	Marc Lainez (compensates) Yves Deville	FR [q2] [30h +22.5h] [5 Credits]
⊗ LEPL1510	Project 4 (in construction)	Pierre Latteur	FR [q2] [30h +22.5h] [5 Credits]
⊗ LSST1001	IngénieuxSud	Stéphanie Merle Jean-Pierre Raskin (coord.)	FR [q1+q2] [15h+45h] [5 Credits]

o Language Courses

o English courses

A placement test is organized at the beginning of the annual unit 1 and 2. Depending on the obtained mark, the students follow an adapted course. The students with a mark greater or equal to 16/20 keep their mark and could take an additional language course (out of the 180 credits); this additional course will only affect their average mark if credited (mark greater or equal to 10/20)

o LANGL1373	Anglais pour ingénieurs civils III	Ahmed Adriouche (coord.) Catherine Avery Charlotte Diaz Nicholas Gibbs Hila Peer Charlotte Peters (coord.) Adrien Pham Nevin Serbest Françoise Stas Marie Van Reet	EN [q1] [30h] [2 Credits]
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⌘ German courses

⌘ LALLE1500	General German – independent user – vantage	Virginie Godin (coord.) Joy Picrit (compensates Virginie Godin)	DE [q1+q2] [90h] [2 Credits]
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⌘ Spanish Courses

⌘ LESP1500	Spanish Advanced level (B1.2 , B2.1)	Alicia Maria Tirado Fernandez (compensates Carmen Vallejo Villamor)	ES [q1] [45h] [2 Credits]
⌘ LESP1101	Spanish beginner's level 1st part (0-A1)	Begona Garcia Migura Juan Landa Diestro Alicia Maria Tirado Fernandez Carmen Vallejo Villamor (coord.)	ES [q1 or q2] [45h] [2 Credits]

o Minor or additional module

FSA1BA - Information

Access Requirements

Decree of 7 November 2013 defining the landscape of higher education and the academic organization of studies.

The admission requirements must be met prior to enrolment in the University.

In the event of the divergence between the different linguistic versions of the present conditions, the French version shall prevail.

SUMMARY

- [General access requirements](#)
- [Specific access requirements](#)
- [Access based on validation of professional experience](#)
- [Special requirements to access some programmes](#)

General access requirements

Except as otherwise provided by other specific legal provisions, admission to undergraduate courses leading to the award of a Bachelor's degree will be granted to students with one of the following qualifications :

1. A Certificate of Upper Secondary Education issued during or after the 1993-1994 academic year by an establishment offering full-time secondary education or an adult education centre in the French Community of Belgium and, as the case may be, approved if it was issued by an educational institution before 1 January 2008 or affixed with the seal of the French Community if it was issued after this date, or an equivalent certificate awarded by the Examination Board of the French Community during or after 1994;
2. A Certificate of Upper Secondary Education issued no later than the end of the 1992-1993 academic year, along with official documentation attesting to the student's ability to pursue higher education for students applying for a full-length undergraduate degree programme;
3. A diploma awarded by a higher education institution within the French Community that confers an academic degree issued under the above-mentioned Decree, or a diploma awarded by a university or institution dispensing full-time higher education in accordance with earlier legislation;
4. A higher education certificate or diploma awarded by an adult education centre;
5. A pass certificate for one of the [entrance examinations](#) organized by higher education institutions or by an examination board of the French Community; this document gives admission to studies in the sectors, fields or programmes indicated therein;
6. A diploma, certificate of studies or other qualification similar to those mentioned above, issued by the Flemish Community of Belgium, the German Community of Belgium or the Royal Military Academy;
7. A diploma, certificate of studies or other qualification obtained abroad and deemed equivalent to the first four mentioned above by virtue of a law, decree, European directive or international convention;

Note:

Requests for equivalence must be submitted to the Equivalence department ([Service des équivalences](#)) of the Ministry of Higher Education and Scientific Research of the French Community of Belgium in compliance with the official deadline.

The following two qualifications are automatically deemed equivalent to the Certificate of Upper Secondary Education (Certificat d'enseignement secondaire supérieur – CESS):

- European Baccalaureate issued by the Board of Governors of a European School,
- International Baccalaureate issued by the International Baccalaureate Office in Geneva.

8. Official documentation attesting to a student's ability to pursue higher education (diplôme d'aptitude à accéder à l'enseignement supérieur - DAES), issued by the Examination Board of the French Community.

Specific access requirements

- To be eligible to apply to a bachelor's programme, holder of a non-belgian degree who do not have Belgian student status must also:
 - have earned a secondary school degree within the last three years;
 - not already hold a bachelor's degree; and,
- Candidates, whatever their nationality, with a secondary school diploma from a country outside the European Union, must have obtained an average of 13/20 minimum or, failing that, have obtained this average, have passed one year of study in Belgium (for example special Maths / sciences).
- For any secondary school diploma **from a European Union country**, the admission request must contain the equivalence of your diploma or, at the very least, proof of the filing of the equivalence request with the Wallonia-Brussels Federation (French Community of Belgium). For any information relating to obtaining an equivalence, please refer to [the following site](#).

- Not to have obtained a secondary education diploma for more than 3 years maximum. Example: for an admission application for the academic year 2021-2022, you must have obtained your diploma during the academic years 2018-2019, 2019-2020 or 2020-2021. In the French Community of Belgium, the academic year runs from September 14 to September 13.[L_information/2021/common-bachelor/](#)

Access based on validation of professional experience

Admission to undergraduate studies on the basis of accreditation of knowledge and skills obtained through professional or personal experience (Accreditation of Prior Experience)

Subject to the general requirements laid down by the authorities of the higher education institution, with the aim of admission to the undergraduate programme, the examination boards accredit the knowledge and skills that students have obtained through their professional or personal experience.

This experience must correspond to at least five years of documented activity, with years spent in higher education being partially taken into account: 60 credits are deemed equivalent to one year of experience, with a maximum of two years being counted. At the end of an assessment procedure organized by the authorities of the higher education institution, the Examination Board will decide whether a student has sufficient skills and knowledge to successfully pursue undergraduate studies.

After this assessment, the Examination Board will determine the additional courses and possible exemptions constituting the supplementary requirements for the student's admission.

Special requirements to access some programmes

- Admission to **undergraduate studies in engineering: civil engineering and architect**

Pass certificate for the [special entrance examination for undergraduate studies in engineering: civil engineering and architect](#).

Admission to these courses is always subject to students passing the special entrance examination. Contact the faculty office for the programme content and the examination arrangements.

- Admission to **undergraduate studies in veterinary medicine**

[Admission to undergraduate studies in veterinary medicine is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses \(non-residents\)](#).

- Admission to **undergraduate studies in physiotherapy and rehabilitation**

[Admission to undergraduate studies in physiotherapy and rehabilitation is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses \(non-residents\)](#).

- Admission to **undergraduate studies in psychology and education: speech and language therapy**

[Admission to undergraduate studies in psychology and education: speech and language therapy is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses \(non-residents\)](#).

- Admission to **undergraduate studies in medicine and dental science**

[Admission to undergraduate studies in medicine and dental science is governed by the Decree of 16 June 2006 regulating the number of students in certain higher education undergraduate courses \(non-residents\)](#).

Note: students wishing to enrol for a **Bachelor's degree in Medicine** or a **Bachelor's degree in dental science** must first sit [an aptitude test \(fr\)](#).

Teaching method

Les étudiant-e-s bacheliers ingénieur civil se voient proposer un programme basé sur la "pédagogie active" qui les amène à prendre une part active dans la gestion de leur formation. Des dispositifs pédagogiques variés sont mis en place chaque année de manière collégiale par les titulaires de cours et en collaboration avec la cellule de coordination pédagogique, et comportent des cours magistraux, des APP (apprentissage par problèmes et par projets), des séances d'exercices, des travaux individuels et de groupe.

Ces dispositifs placent les étudiant-e-s au centre de leurs apprentissages et visent à leur faire acquérir l'ensemble des compétences, des attitudes génériques (c'est-à-dire transversales aux champs disciplinaires) nécessaires pour mener à bien les études d'ingénieur civil et pour entreprendre une carrière professionnelle. Cette méthodologie est définie en cohérence avec les acquis d'apprentissage visés du programme de bachelier.

Les activités proposées au sein des enseignements permettent aux étudiant-e-s de découvrir ou d'exploiter des notions connues mais retravaillées dans un contexte neuf, d'engranger des acquis méthodologiques allant de pair avec un travail d'intégration, d'approfondissement et d'enrichissement des connaissances. Les étudiant-e-s sont initié-e-s au travail coopératif en groupe, à la gestion de leurs apprentissages, à la communication orale et écrite,...

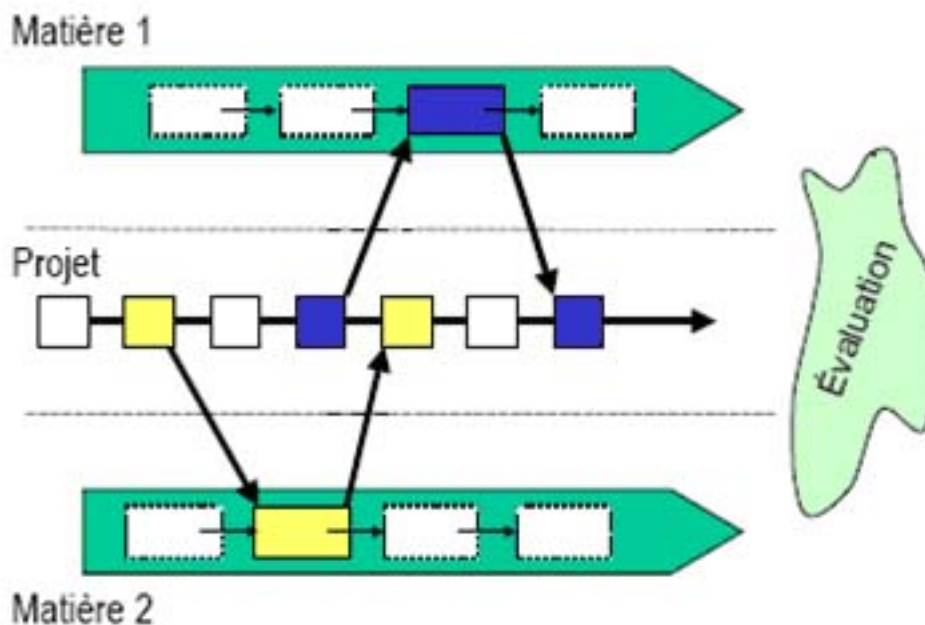
Semaine de lancement S0 (P0)

Pour aborder les objectifs de formation méthodologique dès le début des études, la première semaine du premier bloc annuel du programme de bachelier est une semaine de lancement dénommée P0 présentant une organisation particulière. Les objectifs poursuivis durant cette semaine sont :

- Accueil des étudiant-e-s dans la Faculté ;
- Découverte de l'environnement universitaire et facultaire du site de Louvain-la-Neuve ;
- Initiation méthodologique à certains aspects du travail en équipe, de l'apprentissage par problèmes et par projets (APP).

Apprentissage par projets

Les projets du programme de bachelier visent à intégrer différentes matières du quadrimestre dans une même réalisation. Il ne s'agit donc pas de projets d'application des connaissances acquises précédemment, mais de projets d'apprentissage en interaction permanente avec les disciplines enseignées en parallèle suivant le modèle ci-après :



Apprentissage par problèmes

Au sein des différentes disciplines, des projets motivantes, actuels et interpellants sont proposées aux étudiant-e-s qui ne possèdent cependant pas toujours les compétences nécessaires pour y répondre. Ils nécessitent et amènent donc l'étudiant-e à travailler en groupe, à collaborer et à effectuer des recherches scientifiques, à planifier son travail et à s'organiser.

Ces deux types de situations problèmes coexistent et se complètent : le problème (disciplinaire et de courte durée) et le projet (pluridisciplinaire et se déroulant sur un quadrimestre).

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".

The course activities are evaluated in accordance with the prevailing rules of the University (c.f. exam regulations).

In the context of the projects and certain other subject activities, the student will be closely followed in his studies throughout the whole process, in an effort to situate himself appropriately with respect to his individual work and group work and make any necessary readjustments. On the other hand, he will be evaluated during the course of the quadrimester (ongoing evaluation) and again at the end of the quadrimester for each of the subjects taken, to ascertain whether he fulfils the demands of the programme and has completed the modules concerned successfully. These evaluations are both written and oral. The specific details and procedures for the ongoing evaluation are explained at the beginning of each period of the study programme.

Mobility and/or Internationalisation outlook

International Mobility

Mobility in the Faculty of Applied Sciences is equally a major attraction in the context of these studies. This usually takes place during the 4th or 5th year, i.e. during the master's studies. The students are therefore strongly encouraged to do everything possible to widen their communication skills and their knowledge of languages.

In fact, after being awarded the degree title " Bachelor in Engineering Sciences : Engineering " by UCL, the student will also have access to the existing master's (i.e. from the 4th and 5th years on) within the CLUSTER network - Consortium Linking Universities of Science and Technology for Education and Research, of which the Faculty is a member. Furthermore, UCL students benefit from the same access conditions as the bachelor students from these institutions. This European network groups together : UPC - Barcelona / TU-Darmstadt / TU-Eindhoven / INPG-Grenoble / Uni-Karlsruhe / EPFL-Lausanne / Imperial College London / KTH-Stockholm / Politecnico di Torino / UCL-FSA-Louvain-la-Neuve.

In the context of the master's studies in Engineering Sciences at UCL, the student is also entitled access to the ensemble of the Erasmus/Socrates exchange programmes which UCL has subscribed to together with universities from numerous European or extra-European countries, as well as the Catholic University of Leuven (KUL).

Possible trainings at the end of the programme

Access to the master's of Engineering Sciences - Engineering

The bachelor's programme in Engineering entitles direct access to the master's programme in Engineering, in the orientation corresponding to one of the specialization tracks followed (otherwise prerequisites could be required)

After having accumulated 120 credits spread over 2 years, the student will obtain the title of Master of Engineering Sciences, which is conferred jointly with the professional title of Engineer.

The Ecole Polytechnique de Louvain offers ten different orientations for these studies :

- [Master \[120\] in Civil Engineering](#)
- [Master \[120\] in Chemical and Materials Engineering](#)
- [Master \[120\] in Physical Engineering](#)
- [Master \[120\] in Electrical Engineering](#)
- [Master \[120\] in Electro-mechanical Engineering](#)
- [Master \[120\] in Mechanical Engineering](#)
- [Master \[120\] in Computer Science and Engineering](#)
- [Master \[120\] in Mathematical Engineering](#)
- [Master \[120\] in Biomedical Engineering](#)
- [Master \[120\] in Data Science Engineering](#)

Contacts

Curriculum Management

Entity

Structure entity

Denomination

Faculty

Sector

Acronym

Postal address

SST/EPL/BTCI

(BTCI)

Louvain School of Engineering (EPL)

Sciences and Technology (SST)

BTCI

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Academic supervisor: [Vincent Legat](#)

Jury

- Président du Jury: [Jean-Didier Legat](#)
- Secrétaire du Jury: [Paul Fisette](#)

Useful Contact(s)

- Secrétariat: [Catherine Peeters](#)

