

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 specialized training streams (30 credits each), one of these streams can be replaced by an opening minor.

The student has the possibility of choosing two courses in engineering sciences, each in a different orientation. The purpose of this dual track system is to enable students who so wish to have basic training in two engineering science specialities, increasing their technical versatility, or preparing for a master's degree in civil engineering in a field relating to several of the basic orientations offered at the level of the bachelor's program. The distribution of volumes for polytechnic courses is 10 credits in the second annual block and 20 credits in the third annual block.

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**

- Mandatory
- ✘ Optional
- △ Not offered in 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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

				Year		
				1	2	3
● LEPL1502	Project 2	David Bol Jérôme Louveaux Claude Oestges (coord.)	[q2] [30h+30h] [5 Credits]			x

				Year		
				1	2	3
⌘ LTHEO2840	Science and Christian faith	Benoît Bourguine Paulo Jorge Dos Santos Rodrigues	PK [q1] [15h] [2 Credits]		x	
⌘ LTECO2200	Societies-cultures-religions : Human Questions	Régis Burnet	PK [q1] [15h] [2 Credits]		x	

o **Minor or additional module**

Maximum 2 element(s)

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.

- > Specialization track in applied Chemistry and Physics [en-prog-2023-filfyki]
- > Specialization track in Construction [en-prog-2023-filgce]
- > Specialization track in Electricity [en-prog-2023-filelec]
- > Specialization track in Biomedical Engineering [en-prog-2023-filgbio]
- > Specialization track in Computer Science [en-prog-2023-fillinfo]
- > Specialization track in Applied Mathematics [en-prog-2023-filmap]
- > Specialization track in Mechanics [en-prog-2023-filmeca]
- > Minor in Scientific Culture [en-prog-2023-mincults]
- > Minor in Geography [en-prog-2023-mingeog]
- > Minor in Mathematics [en-prog-2023-minmath]
- > Minor in Physics [en-prog-2023-minphys]
- > Minor in Statistics, Actuarial Sciences and Data Sciences [en-prog-2023-minstat]
- > Minor in Urban Architecture [en-prog-2023-minarch]
- > Minor in Development and Environment [en-prog-2023-mindenv]
- > Minor : Issues of Transition and Sustainable Development (*) [en-prog-2023-mindd]
- > Minor in Economics [en-prog-2023-minecon]
- > Minor in entrepreneurship (*) [en-prog-2023-minmpme]
- > Minor in Gender Studies [en-prog-2023-mingenre]
- > Minor in European Studies [en-prog-2023-mineuro]
- > Minor in Mangement (basic knowledge) [Programme pour les étudiants de l'EPL exclusivement] [en-prog-2023-minogest-version-EPL]
- > Minor in Information and Communication [en-prog-2023-mincomu]
- > Minor in Human and Social Sciences [en-prog-2023-minhuso]
- > Minor in Law (access) [en-prog-2023-minadroi]
- > Minor in Law (openness) [en-prog-2023-minodroi]
- > Minor in Culture and Creation [en-prog-2023-mincucrea]
- > Minor in Literary Studies [en-prog-2023-minlitt]
- > Minor in Dutch Studies (*) [en-prog-2023-minneer]
- > Minor in Musicology [en-prog-2023-minmusi]
- > Minor in Philosophy [en-prog-2023-minfilo]
- > Minor in Biomedicine (openness) [en-prog-2023-minsbim]

(*) This programme is the subject of access criteria

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

○ Non-disciplinary Courses

○ Cours obligatoires

The students attend these two courses

○ LEPL1801	Engineering ethics	Alexandre Guay	PS [q1] [22.5h] +15h] [3 Credits]
○ LEPL1803	Economy	Olivier Daxhelet Julien Hendrickx	PS [q2] [30h] +30h] [5 Credits]

○ Language Courses

○ English courses

○ LANGL1171	Anglais pour ingénieurs civils I <i>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)</i>	Hila Peer Marc Piwnik Nevin Serbest (coord.) Anne-Julie Toubeau (coord.)	PS [q1] [12h] [2 Credits]
-------------	--	--	---------------------------------

⌘ Dutch courses

⌘ LNEER1300	General and academic Dutch - intermediate level	Hilde Bufkens (coord.)	PS [q1 or q2] [30h] [2 Credits]
-------------	---	------------------------	--

⌘ German courses

⌘ LALLE1101	German beginner's level 1st part (0-A1)	Fanny Desterbecq (compensates Ann Rinder)	DIP [q1 or q2] [45h] [2 Credits] 
-------------	---	---	---

FSA1BA - 2ND ANNUAL UNIT

- Mandatory
-

⌘ LESPA1301	Spanish intermediate level, 1st part (A2-B1.1)	Begona Garcia Migura (coord.) Alicia Maria Tirado Fernandez (coord.)	ES [q1 or q2] [45h] [3 Credits] 🌐
⌘ LESPA1302	Spanish intermediate level, 2nd part (B1.1-B1.2)	Alicia Maria Tirado Fernandez (coord.)	ES [q2] [45h] [3 Credits] 🌐

FSA1BA - 3RD ANNUAL UNIT

- Mandatory
- ✂ Optional
- △ Not offered in 2023-2024
- ⊖ Not offered in 2023-2024 but offered the following year
- ⊕ Offered in 2023-2024 but not the following year
- △ ⊕ Not offered in 2023-2024 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 \(objectives, methods, evaluation...\)](#)

o **Obligatory Courses**

o **General Courses**

⌘ LEPL1511	Project 4 (in business projects creation)	Julien Hendrickx (coord.)	18 [q2] [30h +22.5h] [5 Credits]
⌘ LSST1001	IngénieursSud	Stéphanie Merle Jean-Pierre Raskin (coord.)	18 [q1+q2] [15h +45h] [5 Credits]

○ Language Courses

○ English courses

○ LANGL1373	English for engineers 3	Ahmed Adriouche (coord.) Stéphanie Brabant Nicholas Gibbs Ariane Halleux Adrien Kefer Philippe Neyt Hila Peer
-------------	-------------------------	--

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](https://uclouvain.be/fr/etudier/inscriptions/examens-admission.html) (https://uclouvain.be/fr/etudier/inscriptions/examens-admission.html) 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

- Access to bachelor programmes for candidates of nationality outside the European Union who are not assimilated to Belgian nationals is subject to the following criteria:
 - not have obtained a secondary education diploma for more than 3 years maximum. Example: for an admission application for the academic year 2023-2024, you must have obtained your diploma during the academic years 2020-2021, 2021-2022 ou 2022-2023. In the French Community of Belgium, the academic year runs from September 14 to September 13
 - not already hold an undergraduate degree
- 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). A non-successful year will not be taken into consideration.

- For any secondary school diploma **from a European Union country**, the admission request must contain the equivalence of your

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 (<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".

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.

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](#)
- [Master \[120\] in Energy Engineering](#)

Contacts

Curriculum Management

Entity

Structure entity

SST/EPL/BTCI

Denomination

(BTCI)

Faculty

Louvain School of Engineering (EPL)

Sector

Sciences and Technology (SST)

Acronym

BTCI

Postal address

Croix du Sud 1 - bte L6.11.01

1348 Louvain-la-Neuve

Academic supervisor: [Vincent Legat](https://uclouvain.be/repertoires/vincent.legat) (<https://uclouvain.be/repertoires/vincent.legat>)

Jury

- Président du Jury: [Claude Oestgesix](#) du Su0001 0.207 re f BT /F1 8 Tf 1 /v8 Louv8F1 8 Tf 1 0 0 -.f8vI7p.1 5efS1 -1 12.80000019 538.06097412 Tm [

