

- Information analysis and management in biological engineering
- 2.3 To master the operational use of specialised tools in engineering sciences (e.g.: systems analysis, statistical analysis, programming, modelling, etc.)([1]):
- Chemometrics and biometrics
 - Thermodynamics
 - Specific tools in relation to the choice of specialisation
- 2.4 To activate and apply their knowledge of engineering with a critical mind and using a quantitative approach to tackle a complex problem in the field of applied chemistry or bioindustries by incorporating processes at different scales ranging from the atomic scale to the organism and matter scale, and up to the process scale.
- 2.5 To locate and understand how companies and organisations operate, including the role of the different players, their financial and social realities and responsibilities and the challenges and constraints which characterise their environment.

[1] The tools are explained on the basis of the radioscropy of the programme and courses.

3. To design and execute a research project, implementing an analytical scientific and, if applicable, systematic approach, to further understanding of an original research problem in their field of specialisation, incorporating several disciplines.

This skill set will develop throughout the 5 years. Amongst others it requires the use of a set of skills as described below. These skills correspond in fact to the different stages of the scientific approach.

The majority of these skills are developed in the Bachelor and Master programmes, with differentiation predominately on 3 levels:

~~4.4 To master the use of scientific tools in the scientific problem addressed~~ 4.4 To master and autonomy demonstrated by the student

- the degree of innovation shown by the student;

- the degree of autonomy demonstrated by the student throughout the process.

3.1 To summarise the state of knowledge on a complex research problem which relates to their choice of specialisation: to research information, to select and validate its reliability based on the nature of the source of the information and comparing several sources.

3.2 To specify and define the research question.

3.3 To examine the research question using conceptual abstraction and formulate hypotheses.

3.4 To develop and implement a rigorous methodology to answer the research question.

3.5 To master and apply statistical data analysis erate, ind

5.4 To plan and develop all the stages of a multidisciplinary project, alone and in a team, and to work together after having allocated the tasks.

5.5 To involve key players at appropriate stages in the process.

5.6 To work within a team and collaborate effectively to achieve common objectives.

5.7 To take and assume the decisions required for the effective project management either alone or in a team in order to achieve the intended objectives.

5.8 To recognise and take into consideration the diversity of opinions and ways of thinking of team members and to manage conflict constructively to work towards a consensual decision.

5.9 To lead a team (demonstrate leadership): to motivate team members, to develop a collaborative climate, to guide them to cooperate in the achievement of a common objective, to manage conflict.

6. To communicate, interact and convince in a professional manner, in French and English at level C1 (Common European Framework of Reference for Languages published by the Council of Europe), both verbally and in writing, adapting to their conversational partners and the context.

6.1 To understand and use scientific articles and advanced technical documents in French and English.

6.2 To communicate information, ideas, solutions and conclusions as well as the knowledge and underlying principles, in a clearly structured, substantiated, concise and comprehensive way (as appropriate) both verbally and in writing according to the standards of communication specific to the context and by adapting their presentation according to the level of expertise of the audience.

6.3 To develop logic diagrams to concisely pose complex global questions.

6.4 To communicate the state of knowledge in a specific field concisely and critically.

6.5 To communicate results and conclusions, and to support a message, in an appropriate manner using scientific tables, graphs and diagrams.

6.6 To communicate effectively and respectfully with various stakeholders, demonstrating listening skills, empathy and assertiveness.

6.7 To argue and convince: to understand the points of view of various stakeholders and present their arguments accordingly.

6.8 To master the IT and technological tools essential for professional communication.

6.9 To learn English to level C1 according to the European Framework.

7. To act critically and responsibly by taking account of sustainable development issues and operating with a humanistic outlook.

The majority of these skills are not developed exclusively through specific activities, but rather as a result of the multiple and diverse situations encountered throughout the course, the educational programmes and the way in which it is run, as well as through the university environment.

7.1 To demonstrate intellectual independence of thought, to examine knowledge and professional practices and trends critically.

7.2 To make decisions and act in society with respect for ethical values and in compliance with laws and conventions.

7.3 To make decisions and act responsibly by factoring in sustainable development values.

7.4 To make decisions and act with respect for humanistic values, cultural openness and solidarity, especially in North–South relations.

7.5 To assume professional responsibilities and act in a managerial capacity vis-à-vis their colleagues.

8. *To demonstrate independence and be proactive in acquiring new knowledge and developing new skills in order to adapt to changing or uncertain situations and to grow, to build a professional project within a continuing development approach.*

The majority of these skills are not developed exclusively through specific activities, but rather as a result of the multiple and diverse situations encountered throughout the course, the educational programmes and the way in which it is run, as well as through the university environment.

Year 1 :

core subjects programme :

1. Foundation special subject: 10 credits
2. Information Analysis and Management special subject: 15 credits
3. Brewing special subject : 11 credits

professional focus programme :

1. Foundation special subject : 30 credits
2. Information Analysis and Management special subject: 30 credits
3. Brewing special subject: 19 credits

choice of one option course from six available :

1. Foundation special subject: 20 credits
2. Information Analysis and Management special subject: 15 credits
3. Brewing special subject: 30 credits

Year 2 :

core subjects programme :

1. Foundation special subject: 50 credits
2. Information Analysis and Management special subject: 45 credits
3. Brewing special subject: 49 credits (dissertation + 19 credits for courses at the University of Lorraine)

professional focus programme :

1. Foundation special subject : 0 credits
2. Information Analysis and Management special subject: 0 credits
3. Brewing special subject: 11 credits (taken at the University of Lorraine)

choice of one option course from six available :

1. Foundation special subject : 10 credits
2. Information Analysis and Management special subject: 15 credits
3. Brewing special subject: 0 credits

Optional subjects :

There are some optional courses within the programme. They may either be chosen from a suggested list or may be chosen freely from all the courses available at UCL or even at another institution. The same applies to all the optional courses in the programme.

All these choices must be made in the timescale laid down by the Faculty Department and agreed by the Academic Secretary. For courses from another faculty or institution, students must gain prior agreement from the lecturer in charge of the course.

Additional training "Business Creation"

Students enrolled on the Master in Bioengineering programme have the possibility of taking a module of interdisciplinary training entitled "*Business Creation*". This additional programme features in the Master programmes of various faculties (Bioengineering, Law, Business Management, Civil Engineering, Psychology). It is designed to provide students, as potential creators, with the tools for analysis and understanding which will help them to appreciate how entrepreneurship works when creating or taking on a business and develop projects of this kind within existing organizations.

In addition, this training enables students to gain familiarity with other disciplines and to learn how to work in multidisciplinary teams.

For further information :





- on the training programme, please refer to : <https://uclouvain.be/fr/etudier/ineo>
- on how the Master in Bioengineering programmes work, please contact the Faculty Office.

CORE COURSES

- Mandatory
 - ✂ Optional
 - △ Not offered in 2024-2025
 - ⊙ Not offered in 2024-2025 but offered the following year
 - ⊕ Offered in 2024-2025 but not the following year
 - △ ⊕ Not offered in 2024-2025 or the following year
 - Activity with requisites
 - 🌐 Open to incoming exchange students
 - 🚫🌐 Not open to incoming exchange students
 - 🇫🇷 Teaching language (FR, EN, ES, NL, DE, ck9et)
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o **Stage d'insertion socio-professionnelle (10 credits)**

Stage d'insertion socio-professionnelle ou unités d'enseignement à choisir dans le programme alternatif

				Year	
				1	2
⌘ LBIR2050	Challenges of sustainable development and transition	Valentin Couvreur Nathalie Delzenne Valérie Swaen (coord.)	EN [q2] [30h] [5 Credits] 		x
⌘ LBIR2050A	Challenges of sustainable development and transition	Valentin Couvreur Nathalie Delzenne Valérie Swaen	EN [q1 or q2] [22.5h] [3 Credits] 		x
⌘ LBIRA2113	Systèmes alimentaires du Futur	Marleen Abdel Massih Philippe Baret (coord.)	EN [q2] [42.5h] [5 Credits] 		x
⌘ LEPL2211	Business issues introduction	Benoît Gailly	EN [q2] [30h] [3 Credits]  > French-friendly		x
⌘ LLSMG2054	Management humain	Laurent Taskin			



				Year	
				1	2
⌘ LINGE1322	Computer science: Analysis and Design of Information Systems	Jean Vanderdonckt	📄 [q2] [30h+15h] [5 Credits] 🌐	x	
⌘ LINMA2472	Algorithms in data science				

⌘ LGBIO2060

OPTION 2C - BIOMOLECULES & CELLS [24.0]

- Mandatory
 - ✘ Optional
 - △ Not offered in 2024-2025
 - ⊖ Not offered in 2024-2025 but offered the following year
 - ⊕ Offered in 2024-2025 but not the following year
 - △ ⊕ Not offered in 2024-2025 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, ...)
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OPTION 3C - NANO(BIO)MATERIALS AND CATALYSIS [24.0]

- Mandatory
- ✘ Optional
- △ Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:

● LBRNA2102	Material surface characterisation	David Alsteens (coord.) Pierre Eloy (compensates) Christine Dupont Eric Gaigneaux	EN [q2] [45h] [4 Credits] 🌐 > French-friendly	X	
● LBRNA2103	Chemistry of solids	Eric Gaigneaux	FR [q1] [42h] [4 Credits] 🌐 > English-friendly	X	
● LBRNA2201	Principles in heterogeneous catalysis	Eric Gaigneaux	FR [q1] [52.5h] [5 Credits] 🌐 > English-friendly		X
● LBRNA2202	Nano-biotechnologies	Yves Dufrêne	FR [q2] [30h] [3 Credits] 🌐	X	
● LCHM1361	Introduction to polymer chemistry	Jean-François Gohy	FR [q2] [22.5h] [3 Credits] 🌐	X	
● LGBIO2030	Biomaterials	Sophie Demoustier Christine Dupont	EN [q1] [30h+30h] [5 Credits] 🌐 > French-friendly		X

OPTION 4C - ENVIRONMENTAL TECHNOLOGY [24.0]

- Mandatory
- ✘ Optional
- △ Not offered in 2024-2025
- Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 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

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⌘ Unités d'enseignement obligatoires pour l'étudiant-e qui ne les auraient pas créditées en Bachelier (7 credits)

○ LBIR1325B	Transfer of fluids and energy for Bio-engineer	Yann Bartosiewicz Quentin Goor (compensates Mathieu Javaux) Marnik Vanclooster	FR [q2] [0h+30h] [2 Credits]	X
○ LBIR1336	Soil science and integrated excursions	Yannick Agnan (coord.) Richard Lambert Caroline Vincke	FR [q2] [30h+37.5h] [5 Credits] > English-friendly	X

○ Courses to be chosen for 11 credits minimum

L'étudiant-e inscrit-e aux unités d'enseignement LBIR1325B (2 crédits) et LBIR1336 (5 crédits) choisit 4 crédits minimum parmi les unités d'enseignement suivantes :

⌘ LBRES2102	Engineering of the water and the pollutants in grounds and groundwaters	Marnik Vanclooster	FR [q2] [22.5h+22.5h] [4 Credits] > French-friendly	X
⌘ LBRES2103	Soil physics applied to Agronomy and Environment	Charles Bielders (coord.) Mathieu Javaux Mathieu Javaux (compensates Charles Bielders)		

OPTION 10C - DATA SCIENCE [25.0]

- Mandatory
- ⊗ Optional
- △ Not offered in 2024-2025
- ⊖ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- 🌐 Open to incoming exchange students
- 🚫 Not open to incoming exchange students
- (FR) Teaching language (FR, EN, ES, NL, DE, ...)

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

Year

1 2

o Content:

● LBRAI2219	Systems Biology Modelling	Valentin Couvreur (compensates Mathieu Javaux) Xavier Draye (coord.) Guillaume Lobet	(FR) [q2] [30h] [3 Credits] 🌐 > English-friendly		x
● LBRTI2101B	Data Science in bioscience engineering	Patrick Bogaert Emmanuel Hanert			

OPTION 18C : HUMAN HEALTH [24.0]

- Mandatory
 - ✘ Optional
 - △ Not offered in 2024-2025
 - Not offered in 2024-2025 but offered the following year
 - ⊕ Offered in 2024-2025 but not the following year
 - △ ⊕ Not offered in 2024-2025 or the following year
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○ LBIR1325A	Transfer of fluids and energy for Bio-engineer	Yann Bartosiewicz Quentin Goor (compensates Mathieu Javaux) Marnik Vanclooster	FR [q1] [37.5h+22.5h] [5 Credits] 🌐
○ LBIR1340	Basis of quantum mechanics and spectroscopy	Eric Gagneaux (coord.) Xavier Gonze	FR [q2] [22.5h+22.5h] [3 Credits] 🌐 > English-friendly
○ LBIR1341	Laboratories, seminars and integrated practice of analytical chemistry	Arnaud Detaille (compensates Christine Dupont) Christine Dupont (coord.) Thibaut Huybrechts (compensates Christine Dupont)	FR [q1] [30h+45h] [5 Credits] 🌐
○ LBIR1342	Analyse de composés organiques dans des matrices complexes	Sonia Collin	FR [q2] [30h+45h] [5 Credits] 🌐
○ LBIR1346	Surface and colloid chemistry	Christine Dupont Aurélien vander Straeten (compensates Christine Dupont)	FR [q2] [30h] [3 Credits] 🌐
○ LBIR1349	Analytical Chemistry I	Christine Dupont (coord.) Yann Garcia Yann Garcia (compensates Christine Dupont)	FR [q1] [30h+15h] [3 Credits] 🌐
○ LBIR1350	General Microbiology	Annika Gillis	FR [q2] [37.5h+15h] [4 Credits] 🌐
○ LBIR1351	Introduction to systems analysis	Philippe Baret	FR [q1] [10h+20h] [3 Credits] 🌐
○ LBIR1352P	General genetics <i>Le cours magistral étant commun, les partims M et P du cours LBIR1352 ne peuvent être cumulés.</i>	Philippe Baret Annika Gillis Jacques Mahillon	FR [q2] [30h+7.5h] [3 Credits] 🌐
○ LBIR1355	microbial metabolism and biomolecules synthesis	Laure-Alix Clerbaux Michel Ghislain (coord.)	FR [q2] [22.5h+15h] [3 Credits] 🌐
○ LBIR1360	Firm management and organisation	Pierre De Muelenaere	EN [q1] [30h+7.5h] [3 Credits] 🌐 > French-friendly

○ Specifics courses (10 credits)

○ LBIR1130	Introduction to Earth sciences	Pierre Delmelle (coord.) Sophie Opfergelt	FR [q2] [30h+30h] [6 Credits] 🌐
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Pierre Delmelle (coord.)

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.

BIRC2M - Information

Access Requirements

Master course admission requirements are defined by the French Community of Belgium Decree of 7 November 2013 defining the higher education landscape and the academic organisation of courses.

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

Unless explicitly mentioned, the bachelor's, master's and licentiate degrees listed in this table or on this page are to be understood as those issued by an institution of the French, Flemish or German-speaking Community, or by the Royal Military Academy.

BA en agronomie, orientation environnement - crédits supplémentaires entre 45 et 60

BA en agronomie, orientation forêt et nature - crédits supplémentaires entre 45 et 60

BA en agronomie, orientation systèmes alimentaires durables et locaux - crédits supplémentaires entre 45 et 60

BA en agronomie, orientation techniques et gestion agricoles - crédits supplémentaires entre 45 et 60

BA en agronomie, orientation techniques et gestion horticoles - crédits supplémentaires entre 45 et 60

BA en agronomie, orientation technologie animale - crédits supplémentaires entre 45 et 60

BA en chimie, orientation biochimie - crédits supplémentaires entre 45 et 60

BA en chimie, orientation biotechnologie - crédits supplémentaires entre 45 et 60

BA en chimie, orientation chimie appliquée - crédits supplémentaires entre 45 et 60

BA en chimie, orientation environnement - crédits supplémentaires entre 45 et 60

Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
Masters			
		Access based on application	
		Access based on application	
		Access based on application	

Access based on validation of professional experience

> It is possible, under certain conditions, to use one's personal and professional experience to enter a university course without having the required qualifications. However, validation of prior experience does not automatically apply to all courses. Find out more about [Validation of priori experience](#).

Access based on application

Access based on application : access may be granted either directly or on the condition of completing additional courses of a maximum of 60 ECTS credits, or refused.

Admission and Enrolment Procedures for general registration

Teaching method

The overall structure of the programmes for the Bachelor of Science in Engineering (Bioengineering) and the Master in Bioengineering clearly reflect the

concepts of specialization, gradual choice and individualization of the courses.

1st cycle (Bachelor) :

- same programme for SC and AGRO in first year (BIR11BA),
- special programme in second year (BIR12BA) for all the BIR students
- distinct programme with 30 credits for option courses in third year (BIR

