UCLouvain

BIRC2M

2024 - 2025

Master [120] in Chemistry and Bioindustries

At Louvain-la-Neuve - 120 credits - 2 years - Day schedule - In French
Dissertation/Graduation Project : **YES** - Internship : **optional**
Activities in English: **YES** - Activities in other languages : **NO**
Activities on other sites : **NO**
Main study domain : **Sciences agronomiques et ingénierie biologique**
Organized by: **Faculty of bioscience engineering (AGRO)**
Programme acronym: **BIRC2M** - Francophone Certification Framework: 7

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BIRC2M - Teaching profile

Learning outcomes

Master in Chemistry and Bio-industries students must endeavour to diagnose and solve complex and original issues in bioengineering

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
- [FR] Teaching language (FR, EN, ES, NL, DE, ck9et

Year

			Year 1	Year 2
⊠ LBIR2050	Challenges of sustainable development and transition	Valentin Couvreur Nathalie Delzenne Valérie Swaen (coord.)		

		Year 1	Year 2
⊠ LINGE1322	Computer science: Analysis and Design of Information Systems		

				Year 1	Year 2
⊠ LGBIO2060	Modelling of biological systems	Hari Teja Kalidindi (compensates Philippe Lefèvre) Laurent Opsomer (compensates Philippe Lefèvre)	DN [q1] [30h+30h] [5 Credits] *> French-friendly*	x	

OPTIONS

From 23 to 25credit(s)

> Option 1C - Food & quality *[en-prog-2024-birc2m-lbirc201o]*
> Option 2C - Biomolecules & cells *[en-prog-2024-birc2m-lbirc202o]*
> Option 3C - Nano(bio)materials and catalysis

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, ...)

Year
1 2

⊠ 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

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...)

Content:

				Year 1	Year 2
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 12C - SUSTAINABILITY ENGINEERING [23.0]

- 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...)

Content:

				Year 1	Year 2
LBIR1362	Environmental Economics	Frédéric Gaspart	FR [q2] [30h+7.5h] [3 Credits]	x	
LBIRE2131	Environmental Impact Assessment : diagnosis and indicators	Charles Bielders (coord.) Pierre Defourny Pierre Defourny (compensates Charles Bielders) Lisa Delfosse (compensates Charles Bielders)	FR [q2] [22.5h] [3 Credits]	x	
LBIRE2205B	Decision tools and project management - Project Management	Raphaël Amory Frédéric Gaspart	EN [q1] [15h] [1 Credits] *> French-friendly*		x
LBIRE2235	Innovative system management for sustainability	Benjamin Berger (compensates Francesco Contino) Quentin Goor (compensates Mathieu Javaux) Mathieu Javaux (coord.) Goedele Van den Broeck	EN [q1] [22.5h+7.5h] [3 Credits] *> French-friendly*		x
LBRAI2213	Impact evaluation in agriculture	Goedele Van den Broeck	EN [q2] [30h+8h] [4 Credits] *> French-friendly*	x	
LBRES2101	Smart technologies for environmental engineering	Sébastien Lambot	EN [q1] [32.5h+20h] [4 Credits] *> French-friendly*	x	
LBRTI2102	Process-based modelling in bioscience engineering	Emmanuel Hanert	EN [q1] [30h+15h] [5 Credits] *> French-friendly*		x

Course prerequisites

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

The programme's courses and learning outcomes

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

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 animalière - 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**C**13BA, BIR**A**13BA, BIR**E**13BA) : three advanced subsidiary subjects available : chemistry (BIRC), agronomy (BIRA), environment (BIRE).

2nd cycle (Master) :

â€¢ choice of three Masters in Bioengineering with a professional focus, together with twelve option courses which partly overlap, optional subjects (either free choice or from the lists) and a final individual dissertation.

This overall structure gives students the opportunity to have a highly individualized programme whilst at the same time retaining both the **comprehensive nature** of the training and the foundation elements of university education : **independence, competence**, **open-mindedness and interest in research**.

The twelve option courses, which partly overlap at the level of the three Masters in Bioengineering, correspond to fields of activity identified on the basis of a wide-ranging survey of graduates of the Faculty working professionally and of contacts with potential employers.

The interdisciplinarity and the integrated approach are key dimensions in the training of **bioengineers in chemistry and bioindustry**. This is reflected by :

- availability of courses organized by other faculties ;
- grouping of training activities : combined exercises, joint project, analysis of real situations, simulations ;
- the perception, analysis, diagnosis and content of the course specifications (management, design of new processes etc) combine different kinds of tools (field observation, laboratory analysis, databases, chimiometrics etc) and various scales in space (from the molecular to plots of land and farms, from an agricultural region to a sub-continent and beyond) and in time ;
- teaching teams with a wide range of expertise ;
- learning how best to work in groups of students to develop a real, independent capacity for intellectual work.

Training for research. through research, which is essential for conceptual and innovative awareness and developing intellectual rigour, is reflected by different types of activities :

- producing a final dissertation and taking part in dissertation seminars ;
- participation in subject seminars providing direct contact with young researchers working in the field of chemistry, applied biology and bioindustry;
- presentation of seminars by students from an outside research group or groups and the production of a dissertation.

The application of skills, knowledge and techniques that students have acquired and how they use them together is taken into account in an integrated project in applied chemistry and biology. This is an important learning activity supplements the dissertation which, in the view of the Faculty, remains the most important part of training for research.

Through the close connection between the teaching and research, the development of new tools and new approaches is the subject of advanced training from the beginning of the 2nd cycle and is therefore central to this Master programme (e.g. biotechnology and nanotechnology). All this enables graduates of this programme to be able to make rapid use of new techniques and approaches in their early professional experience.

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".

Students are assessed according to the activities in the programme : this can take the form of written and/or oral examinations as well as individual and/or group work.

Further details about how the assessment is done can be found in the course specifications.

Mobility and/or Internationalisation outlook

The programme for the Master in Chemistry and Bio-industries offers a wide range of opportunities to study at other institutions, in Belgium, Europe and elsewhere.

The Faculty would like to highlight the strengths of this programme, particularly the potential for research and the fact that it is very much a part of a complete University. The shape of the option courses available has also been influenced by the different fields of activity in which bioengineers work.