BIRA2M - Introduction

Introduction

BIRA2M - Teaching profile

Learning outcomes

Master in Agricultural Sciences Engineering students must endeavour to diagnose and solve complex and original issues in bioengineering through a multidisciplinary approach in order to develop and implement innovative and sustainable solutions.

This Master's programme aims to train experts in the field of sustainable animal and plant production, respectful of the environment and conscious of food security.

The future bioengineers acquire the knowledge and skills required to become:

• professionals able to tackle and diagnose agronomic problems: production and quality, production systems and industries, protection and development of resources, socio-economic impacts;

• scientists able to understand complex processes on different scales, used to multidisciplinary approaches and consultation with other specialists;

• innovators able to design new kinds of production and management methods, new processes, etc. in response to many major challenges: feeding the world, bringing together food and health, reconciling agriculture, environment and sustainable development.

Highly versatile and multidisciplinary in character, the course dispensed by the Faculty of Biological, Agricultural and Environmental Engineering focuses on acquiring skills which combine theory and practice to train "bioengineers" mastering a broad base of scientific and technological knowledge and skills, allowing them to adopt an integrated approach to biological, agricultural and environmental systems.

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

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 five 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 three levels:

- the level of detail and complexity applied to the scientific problem/research studied;

- 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 tools in the context of a complex scientific issue.

3.6 To analyse and interpret the results to produce a substantiated critique on a complex scientific question.

3.7 To demonstrate an ability to summarise and formulate conclusions on a complex scientific question.

3.8 In each of the skills mentioned above, to demonstrate rigour, precise resear7458.36303e statomplex sci00049 Tm [(information, to selbl to sthes te a

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 computerised and technological tools essential for professional communication.

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

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

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.

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.

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.

8.1 To manage their work independently: to set priorities, anticipate and plan all the activities in time, including in the face of changing, uncertain or urgent situations.

8.2 To manage stress and frustrations in urgent, changing, inconsistent or uncertain situations.

8.3 To question and know themself: to undergo self-assessment, by analysing their successes and failures, to identify strengths and weaknesses and their personal performance in relation to the context.

8.4 To grow personally and professionally: to build a professional project in line with their own values and aspirations, to manage their motivation and involvement in bringing the project to fruition, to persevere in complex situations.

8.5 To independently identify and absorb new knowledge and skills essential for learning to understand new contexts quickly.

8.6 To commit to the lifelong learning which will allow them to grow socially and professionally.

Programme structure

This programme comprises a series of activities totalling 120 credits spread over two years worth 60 credits each. It is structured as follows :

Year 1 :

- compulsory professional focus programme for 30 credits.
- compulsory core subjects programme : 5 credits (out of 40) are taken in the first year. All the others (35 credits) from the core subjects programme are taken in the second year.
- choice of one option course of 30 credits from a list of six. The majority of option courses (25 credits) are organized in the first year. Certain courses (5 credits), as already mentioned, are taken in the second year.

  Certain option courses are organized jointly with one or two other programmes from the Master in Bioengineering. This is the
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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 and Psychology). It is designed to provide students, as potential creators, with the tools for analysis and understanding which will help them 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.

BIRA2M Programme

Detailed programme by subject

CORE COURSES [60.0]

Au sein de ce programme, des cours sont proposés au choix. Ils sont à choisir au sein d'une liste ou peuvent faire l'objet d'un choix totalement libre dans le portefeuille de cours de l'UCL, voire d'une autre institution. Tous ces choix doivent être validés par le vice-doyen et/ou avoir reçu l'accord préalable du titulaire du cours, si le cours est emprunté dans une autre faculté ou institution.

- O 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 LBIRA2200	Master thesis		FR [q1+q2] [] [27 Credits]		x
O LBIRA2210	Master thesis' accompanying seminar	Philippe Baret Cathy Debier Frédéric Gaspart Anne Legrève (coord.)	EN [q1+q2] [30h] [3 Credits] *> French-friendly*		x

O Projet disciplinaire (10 credits)

O LBIRA2130	Disciplinary project in Agronomy	Philippe Baret Claude Bragard Cathy Debier Xavier Draye Annika Gillis Richard Lambert Anne Legrève Guillaume Lobet Goedele Van den Broeck (coord.)	FR [q2] [100h+0h] [10 Credits]	x	

O Projet intégré (10 credits)

⊠

				Year 1	2
LBRPP2211	Biological control and plant health	Claude Bragard Stephan Declerck Anne Legrève (coord.)	EN [q2] [37.5h+0h] [4 Credits] *> English-friendly*		x
LBRTE2201	Human and environmental toxicology	Cathy Debier	EN [q1] [30h+7.5h] [4 Credits] *> French-friendly*		x
LBRTI2101A	Data Science in bioscience engineering	Patrick Bogaert Emmanuel Hanert	FR [q1] [22.5h+15h] [3 Credits] *> English-friendly*		x
LSTAT2340	Statistical Analyses of ¿omics Data	Laura Symul	FR [q2] [15h+5h] [4 Credits]		x

PROFESSIONAL FOCUS [30.0]

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OPTIONS

Les étudiants ont le choix entre 7 options en première année de master et 11 modules d'approfondissement en deuxième année de master. La plupart des combinaisons sont possibles. Cependant, les étudiants sont invités à réfléchir dès la première année à l'articulation des options et des modules, certains modules suivant de manière préférentielle certaines options.

Les étudiants qui souhaitent suivre le module interdisciplinaire en entrepreneuriat (INEO) doivent s'y inscrire en même temps qu'à l'option dès la première année de master. En effet, le programme de ce module devra s'articuler avec celui de l'option sur les deux années de master.

Attention: l'inscription à ce module fait l'objet d'une sélection qui a lieu au moment de la rentrée académique. Une fois sélectionnés, les étudiants prendront contact avec le vice-doyen pour aménager leur programme de cours personnel et répartir les cours INEO et les cours d'option sur les deux années du master.

La participation au programme Erasmus Mundus interuniversitaire AFEPA (Agricultural, Food and Environmental Policy Analysis) fait également l'objet d'une sélection dont les modalités sont décrites à la page suivante: www.uclouvain.be/afepa

OPTION 1A - FOOD NUTRITION AND HEALTH [30.0]

O 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

OPTION 8A [30.0]

OPTION 10A - DATA SCIENCE [30.0]

- 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

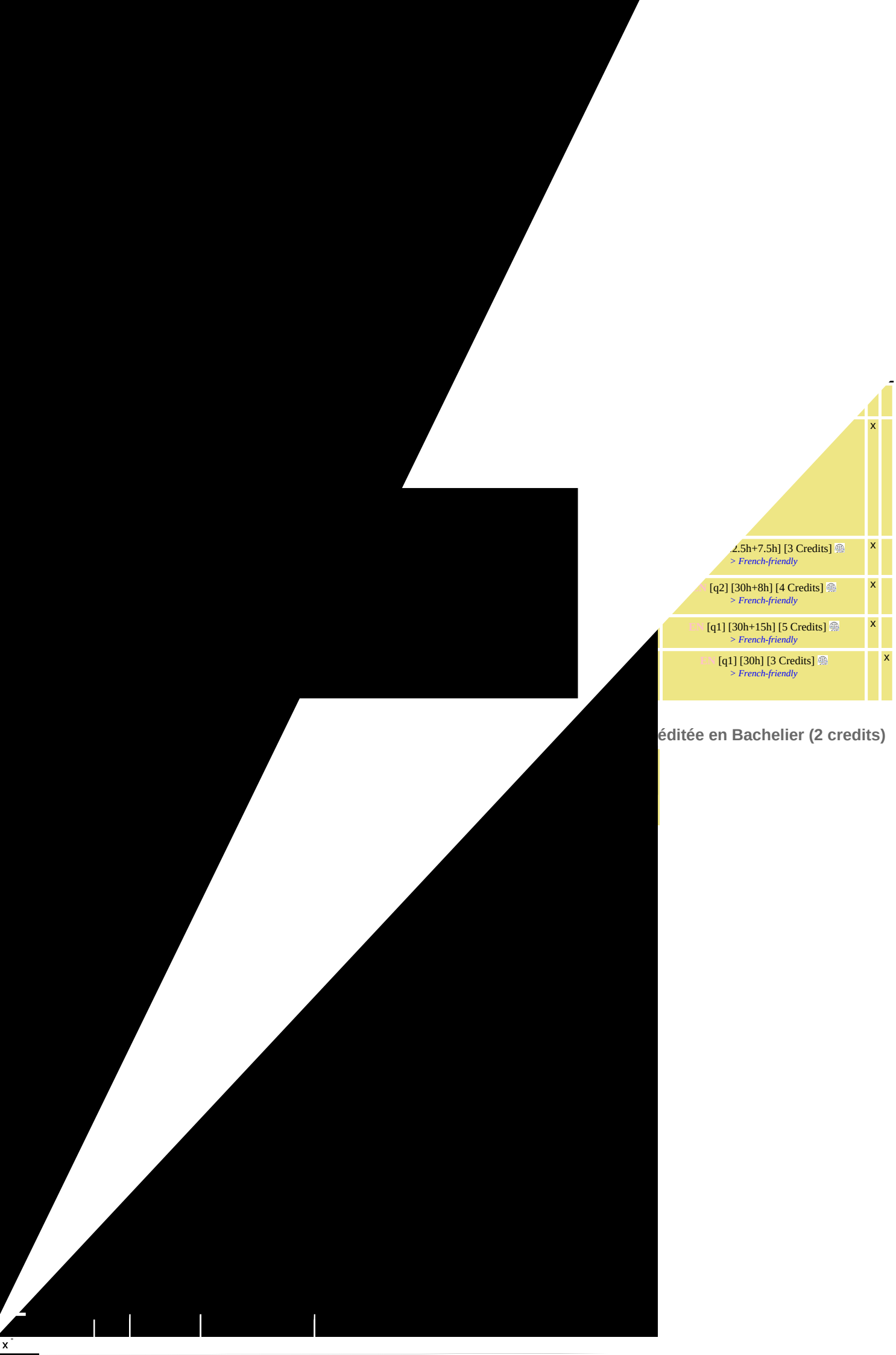
OPTION 11A - AGRICULTURAL AND RESOURCE ECONOMICS [30.0]

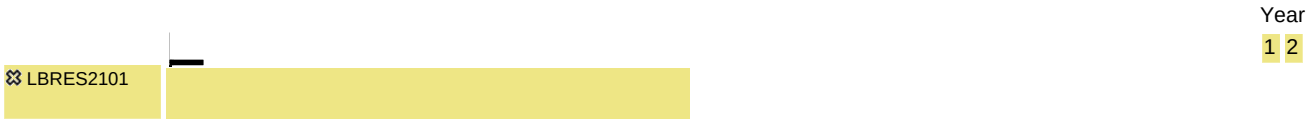
- O Mandatory
- ⊠ Optional
- △ Not offered in 2024-2025
- ⊘ Not offered in 2024-2025 but offered the following year
- ⊕ Offered in 2024-2025 but not the following year
- △ ⊕ Not offered in 2024-2025 or the following year
- Activity with requisites
- Open to incoming exchange students
- Not open to incoming 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
O LBRAI2208	Firms and Markets : Strategic Analysis	Frédéric Gaspart	EN [q1] [30h] [4 Credits] *> French-friendly*	x	
O LBRAI2210	Microeconomics of Development	Frédéric Gaspart	EN [q1] [30h] [3 Credits] *> French-friendly*	x	
O LBRAI2212	Economics of Rural Development	Goedele Van den Broeck	EN [q1] [30h] [3 Credits] *> French-friendly*	x	
O LBRAI2213	Impact evaluation in agriculture	Goedele Van den Broeck	EN [q2] [30h+8h] [4 Credits] *> French-friendly*	x	
O LECON2033	Applied econometrics: Microeconometrics	Bertrand Verheyden (compensates Muriel Dejemeppe)	FR [q1] [30h+12h] [5 Credits]		


x
.5h+7.5h] [3 Credits]
> French-friendly
x
[q2] [30h+8h] [4 Credits]
> French-friendly
x
[q1] [30h+15h] [5 Credits]
> French-friendly
x
[q1] [30h] [3 Credits]
> French-friendly
x
éditée en Bachelier (2 credits)


Year
1
2
LBRES2101

OPTION 18A - HUMAN HEALTH [30.0]

- 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
LBIO1237B	Immunology : basis and applications in biology - Lectures	Jean-Paul Dehoux	FR [q1] [25h] [3 Credits]	x	
LBIR1342A	Analyse de composés organiques dans des matrices complexes 1 partim A	Sonia Collin	FR [q2] [30h] [3 Credits]	x	
LBIRC2109A	Process engineering: Unit operations	Damien Debecker	FR [q2] [30h+7.5h] [3 Credits] > *English-friendly*	x	
LBRAL2102	Physiological and nutritional biochemistry	Cathy Debier (coord.) Emeline Dierge	EN [q1] [37.5h+0h] [4 Credits] > *French-friendly*	x	
LBRTE2201	Human and environmental toxicology	Cathy Debier	EN [q1] [30h+7.5h] [4 Credits] > *French-friendly*	x	
LCHM2244	Medicinal chemistry	Raphaël Frédérick Didier Lambert	EN [q2] [22.5h+7.5h] [3 Credits] > *French-friendly*	x	
LGBIO2030	Biomaterials	Sophie Demoustier Christine Dupont	EN [q1] [30h+30h] [5 Credits] > *French-friendly*		x
LSTAT2330	Statistics in clinical trials.	Catherine Legrand Annie Robert	FR [q2] [22.5h+7.5h] [5 Credits]	x	

Supplementary classes

To access this Master, students must have a good command of certain subjects. If this is not the case, in the first annual block of their Masters programme, students must take supplementary classes chosen by the faculty to satisfy course prerequisites.

- 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
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- Activity with requisites
- Open to incoming exchange students
- Not open to incoming exchange students
- [FR] Teaching language (FR, EN, ES, NL, DE, ...)

LBIR1360	Firm management and organisation	Pierre De Muelenaere	EN

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

BA en agronomie, orientation agronomie des régions chaudes - crédits supplémentaires entre 45 et 60

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

peuvent être consultés dans le module complémentaire.