

**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: **Faculté des bioingénieurs (AGRO)**

 Programme acronym: **birf2m** - Francophone Certification Framework: 7

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## BIRF2M - Introduction

### Introduction

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## BIRF2M - Teaching profile

### Learning outcomes

Master in Forests and Natural Areas 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 management, conservation and the responsible and sustainable use of forests and natural spaces in multiple ecological and socio-economic contexts.

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

- professionals able to tackle and diagnose problems related to the management and use of natural resources and forests and to provide operational solutions: sustainable management of ecosystems, management of natural areas and forests, development of forest-wood resources;
- scientists able to understand complex processes on different spatial and temporal scales, used to multidisciplinary approaches and able to collaborate with other specialists;
- innovators tasked with developing new methods of managing natural environments and forests with a view to ensuring the sustainability of goods, resources and services from ecosystems, in the context of climate change and changing social demands.

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 :

1. To explore a body of knowledge (knowledge, methods and techniques, models and processes) in natural and human sciences which serves as the foundation from which to operate with expertise in the field of forest sciences.

1.1 To build an advanced knowledge base in the field of forest science and more specifically in the following disciplines[1].

- Soil and water sciences
- Ecology
- Wood sciences
- Dendrology
- Geomatics applied to the environment
- Statistics and data analysis
- Economics of natural and forestry resources
- Sustainable development law

1.2 To build highly specialised (cutting-edge) scientific knowledge in one of the following[2] bioengineering specialisations:

- Ecosystems and biodiversity
- Forest and society
- Tropical forestry and development
- Information analysis and management in biological engineering

1.3 To master procedural skills in conducting experiments[3] in a natural or controlled environment, and in the observation and monitoring of forests and natural systems at different scales as well as the specific techniques related to their choice of specialisation.

1.4 To apply their knowledge critically to tackle a complex problem in the field of forest sciences, by incorporating processes at different scales ranging from the living organism scale, to landscape and biosphere.

1.5 To apply multiple strands of knowledge to resolve a multidisciplinary problem in the forest sciences field in order to develop relevant and innovative solutions.

[1] Refers to the choice of the Master (core subjects and professional focus). The knowledge of some of these disciplines will have been partially acquired in the Bachelor's degree (in the advanced minor).

[2] Refers to the option / module choice in the Master.

[3] Refers to mastering all the laboratory and field techniques used for the characterisation or monitoring of a system.

2. To explore an integrated body of "engineering and management knowledge" which serves as the foundation from which to operate with expertise in the forest science field.

2.1 To build an advanced knowledge base (e.g.: concepts, laws, technologies) and tools (e.g. modelling, programming) in engineering sciences:

- Geomatics applied to the environment
- Hydrology
- Applied soil sciences
- Dendrometry: forest resource inventory
- Topometry
- Ecological and forestry diagnosis
- Statistics and data analysis
- Forest engineering and wood transformation

- Temperate and tropical forestry
  - Management of forests and natural areas
  - Land management
- 2.2 To build and master highly specialised knowledge and tools in one of the following bioengineering specialisations:
- Ecosystems and biodiversity
  - Forest and society
  - Tropical forestry and development
  - Information analysis and management in agricultural engineering
- 2.3 To master the operational use of specialised tools in engineering sciences (e.g.: systems analysis, statistical analysis, programming, modelling, etc.)[1]:
- Measurement techniques
  - Statistical data analysis
  - 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 forest science by incorporating long-term processes at different scales ranging from the tree to landscape and biosphere.
- 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 radiology 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:*

- 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, precision and the critical thinking essential for any scientific method.

3.9 To demonstrate innovation in at least one of the skills mentioned above.

4. To formulate and resolve a complex engineering problem in the forest sciences field, related to new situations presenting a degree of uncertainty and by using a systematic approach to develop relevant sustainable and innovative solutions.

4.1 To strategically differentiate the key elements from the less critical elements relating to a complex forest engineering problem, in order to define and determine the field of action for this problem.

4.2 To identify the knowledge acquired and that to be acquired to resolve the complex forest engineering problem.

4.3 To analyse a complex forest engineering problem according to a systematic and multidisciplinary approach in order to carry out diagnostics and formulate the specifications.

4.4 To demonstrate an ability for conceptual abstraction and formalisation in analysing and resolving the complex forest engineering problem.

4.5 To develop scientifically and technologically relevant and innovative solutions, through a multidisciplinary (integration and articulation of knowledge) and quantitative approach, making it possible to develop products, systems, processes or services in the field of agricultural sciences.

4.6 To test solutions and evaluate their impact in relation to an economic, environmental, social and cultural context.

4.7 To formulate concrete and responsible recommendations to encourage sustainable development in relation to the efficient operational and sustainable implementation of the solutions proposed.

5. To design and implement a multidisciplinary project, alone and in a team, with the stakeholders concerned while taking the objectives into account and incorporating the scientific, technical, environmental, economic and human factors.

*The graduate must be able to manage a project alone and in a team, not only the scientific and technological dimensions but also the financial and, if applicable social aspects and with a degree of complexity representative of typical professional scenarios.*

5.1 To know and understand the principles and factors of group dynamics (including the constructive role of conflict).

5.2 To know and understand the project management process (project cycles): formulation and definition of the project, project management, monitoring and evaluation of the project.

5.3 To situate a multidisciplinary project within its environment and identify the issues, constraints and stakeholders and to clearly define its objectives.

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.
- 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.*
- 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 themselves: 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

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

The overall structure of the Bachelor 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 elective modules in third year (BIRC13BA, BIRA13BA, BIRE13BA): three minors available: chemistry (BIRC), agronomy (BIRA), environment (BIRE).

### 2nd cycle (Master):

- choice of four Masters in Bioengineering with a professional focus, together with sixteen elective modules which partly overlap, optional courses (either free choice or from the lists) and a final individual dissertation.

This overall structure gives students the opportunity to customize their 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 sixteen elective modules, which partly overlap at the level of the four 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.

Year 1:

- first part of the compulsory common core curriculum (25 credits),
- compulsory professional focus programme (30 credits),
- choice of one elective module (15 credits) from a list of five. At least 5 credits of this module should be taken during the first year. Certain optional courses may be organised in collaboration with the three other Masters in Bioengineering.

NB: Enrolment in the additional interdisciplinary training module in "Business Creation" is not automatic. In order to enrol, students must submit their application to the coordinators of the Business Creation programme and participate in the selection process.

Year 2:

- remainder of the compulsory common core curriculum (50 credits),
- remainder of the elective module (10 credits)

#### Additional training "Business Creation"

The interdisciplinary training in "Business Creation" is one of the elective modules proposed within the framework of the Master in Forestry and Natural Areas. However, since this module is worth 20 credits (instead of the 15 credits provided for an elective module), some modifications of the common core curriculum are required.

This module **must be taken as of the first year of this Master's programme**

Enrolment is not automatic. In order to enrol, students must apply for admission and participate in a selection process. Only after having received the permission to participate in this programme may students contact the academic secretary to establish their personal course programme and plan the distribution of their courses over the two years of their Master's programme.

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 this training programme, please refer to: <https://uclouvain.be/cpme.html>

*For a programme-type, and regardless of the focus, options/or elective courses selected, this master will carry a minimum of 120 credits divided over two annual units, corresponding to 60 credits each.*

[> Tronc commun](#) [ [en-prog-2019-birf2m-lbirf200t.html](#) ]

[> Professional Focus](#) [ [en-prog-2019-birf2m-lbirf200s](#) ]

[Options courses](#)

[> Ecosystems and Biodiversity \(Option 14F\)](#) [ [en-prog-2019-birf2m-lbirf201o.html](#) ]

[> Tropical Forestry and Development \(Option 16F\)](#) [ [en-prog-2019-birf2m-lbirf203o.html](#) ]

[> Information Analysis and Management in Biological Engineering \(Option 10F\)](#) [ [en-prog-2019-birf2m-lbirf204o.html](#) ]

[> Business Creation \(Option 13F\)](#) [ [en-prog-2019-birf2m-lbirf205o.html](#) ]

## BIRF2M Detailed programme

### Programme by subject

#### CORE COURSES [75.0]

- Mandatory  
 △ Courses not taught during 2019-2020  
 ⊕ Periodic courses taught during 2019-2020
- ✘ Optional  
 ⊖ Periodic courses not taught during 2019-2020  
 ■ Activity with requisites

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

*Students choosing the option Entrepreneurship (13F) realize their master thesis within the interdisciplinary training.*

							Year	
							1	2
○ LBIRF2200	Mémoire de fin d'études			27 Credits			x	
○ LBIRE2210	Master thesis' accompanying seminar	Charles Bielders Patrick Bogaert (coord.) Pierre Delmelle Caroline Vincke	30h	3 Credits	1 + 2q		x	
○ LBIRE2102	Applied Geomatic	Pierre Defourny	30h +22.5h	4 Credits	1q		x	
○ LBIRE2104	Applied soil sciences	Yannick Agnan Pierre Delmelle (coord.)	30h +22.5h	5 Credits	2q		x	
○ LBIRE2106A	Topométrie et photogrammétrie: partie Topométrie	Pierre Defourny François Jonard Sébastien Lambot	15h+7.5h	2 Credits	2q		x	
○ LBIRF2101	Mesure des arbres et des peuplements forestiers	Mathieu Jonard Quentin Ponette (coord.)	30h +22.5h	4 Credits	2q		x	
○ LBIRF2106	Gestion des habitats et des espèces ■	Anne-Laure Jacquemart (coord.) Nicolas Titeux	22.5h +22.5h	4 Credits	1q		x	
○ LBIRF2212	Projet d'aménagement forestier intégré ■	Quentin Ponette Caroline Vincke (coord.)	50h	6 Credits	1q		x	
○ LBIRF2213	Tournée forestière ■	Anne-Laure Jacquemart Quentin Ponette (coord.) Caroline Vincke	30h	2 Credits	2q		x	
○ LBRAT2101B	Aménagement du territoire: Principes	Pierre Defourny Yves Hanin Anne-Laure Jacquemart	45h	3 Credits	1q		x	

#### ○ Internship or free choice of courses

✘ LBIR2000	Masters Internship			10 Credits	2q		x
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#### ✘ Courses to be chosen for 10 credits

#### ○ Statistics - one course to be chosen among the following two: (3 credits)

3 crédits à choisir parmi les activités suivantes :

✘ LBIRE2101	Statistical analysis of spatial and temporal data	Patrick Bogaert	22.5h +15h	3 Credits	2q		x
✘ LBIRA2101A	Biométrie: analyse de la variance	Xavier Draye Bernadette Govaerts	22h+10h	3 Credits	1q		x

Year

1 2

### o Ethics (2 credits)

The students will opt firstly for the course LTECO2300. Two other choices are also available.

⊗ LTECO2300	Societies, cultures, religions : Ethical questions	Marcela Lobo Bustamante	15h	2 Credits	1q	x	x
⊗ LTECO2100	Sociétés, cultures, religions : Biblical readings	Hans Ausloos	15h	2 Credits	1q	x	x
⊗ LTECO2200	Societies-cultures-religions : Human Questions	Régis Burnet Dominique Martens	15h	2 Credits	1 ou 2q	x	x

### PROFESSIONAL FOCUS [30.0]

○ Mandatory

△ Courses not taught during 2019-2020

⊕ Periodic courses taught during 2019-2020

⊗ Optional

⊖ Periodic courses not taught during 2019-2020

■ Activity with requisites

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

Year

1 2

### o Contenu:

○ LBIRF2102	Transformation et industries du bois	Caroline Vincke	30h+7.5h	4 Credits	2q	x	
○ LBIRF2103	Anatomie et propriétés des bois	Caroline Vincke	30h+30h	4 Credits	1q	x	
○ LBIRF2104	Ecologie forestière et phytosociologie	Anne-Laure Jacquemart Quentin Ponette (coord.) Caroline Vincke	37.5h +22.5h	5 Credits	2q	x	
○ LBIRF2105	Sylviculture et dendrologie	Quentin Ponette	30h +52.5h	6 Credits	1q	x	
○ LBIRF2201	Principe d'économie et de génie forestier	Mathieu Jonard (coord.) Caroline Vincke	37.5h	3 Credits	1q	x	x
○ LBIRF2202	Multifunctional forest management ■	Quentin Ponette	15h+15h	3 Credits	1q		x
○ LBRPP2103B	Phytopathologie: Santé des forêts	Olivier Baudry (compensates) Etienne Olivier Claude Bragard Anne Legrève	22.5h	2 Credits	1q	x	
○ LBIRF2204	Sylviculture tropicale et enjeux forestiers internationaux	Christine Farcy (coord.) Sylvie Gourlet Régis Peltier	45h	3 Credits	1q ⊕	x	x



**OPTIONS [15.0]**

L'option en Création d'entreprise (CPME) est une formation interdisciplinaire et interfacultaire (EPL, AGRO, IEPR, PSP, DROIT, IAG-LSM, SC) qui totalise des activités pour 20 crédits, nécessitant un aménagement du programme de cours du tronc commun.

Elle doit être choisie dès la première année et nécessite la participation à une sélection conformément aux règles établies par les responsables du programme CPME. Ce n'est qu'après avoir reçu l'accord de participation à ce programme que les étudiants devront prendre contact avec le vice-doyen pour aménager leur programme de cours personnel et répartir les cours CPME sur les deux années du master.

- > [Ecosystems and Biodiversity \(Option 14F\)](#) [ en-prog-2019-birf2m-lbirf201o ]
- > [Tropical Forestry and Development \(Option 16F\)](#) [ en-prog-2019-birf2m-lbirf203o ]
- > [Information Analysis and Management in Biological Engineering \(Option 10F\)](#) [ en-prog-2019-birf2m-lbirf204o ]
- > [Business Creation \(Option 13F\)](#) [ en-prog-2019-birf2m-lbirf205o ]

**ECOSYSTEMS AND BIODIVERSITY (OPTION 14F) [15.0]**

- Mandatory
- △ Courses not taught during 2019-2020
- ⊕ Periodic courses taught during 2019-2020
- ⊗ Optional
- ⊖ Periodic courses not taught during 2019-2020
- Activity with requisites

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

Year

1 2

**o Contenu:**

○ LBRAT2101C	Aménagement du territoire: Etude de cas	Pierre Defourny Yves Hanin Anne-Laure Jacquemart	0h+15h	3 Credits	1q	x	
○ LSTAT2110A	Analyse des données	Johan Segers	15h+7.5h	3 Credits	1q	x	

**o Courses to be chosen for 9 credits minimum amongst the following list:**

⊗ LBIRE2101	Statistical analysis of spatial and temporal data	Patrick Bogaert	22.5h +15h	3 Credits	2q	x	x
⊗ LBIRE2105	Water and soil quality's Evaluation	Henri Halen Xavier Rollin (coord.)	30h+7.5h	3 Credits	2q	x	x
⊗ LBIRE2204	Territorial diagnostic and decision aid ■	Pierre Defourny	22.5h	3 Credits	2q	x	x
⊗ LBIRE2205	Decision Tools and Project Management	Olivier Cogels Frédéric Gaspard (coord.)	30h+7.5h	3 Credits	1q	x	x
⊗ LBIRF2203	Pisciculture	Xavier Rollin	30h	3 Credits	1q	x	x
⊗ LBOE2120	Conservation de la biodiversité	Nicolas Schtickzelle	36h+12h	4 Credits	1q	x	x
⊗ LBOE2122	Biodiversité du milieu marin	Cathy Debier Jean-François Rees	24h	2 Credits	2q	x	x
⊗ LBOE2140	Landscape ecology	Hans Van Dyck	24h+24h	4 Credits	1q	x	x
⊗ LBOE2143	Questions d'actualité en biologie marine	Cathy Debier Jérôme Malfet Jean-François Rees	24h	2 Credits	2q	x	x
⊗ LBOE2148	Ecologie microbienne	Stephan Declerck	24h	2 Credits	1q	x	x
⊗ LBOE2160	Ecologie des interactions	Thierry Hance Anne-Laure Jacquemart	24h	2 Credits	1q	x	x
⊗ LDROP2061	Sustainable Development Law	Charles-Hubert Born	30h	3 Credits	2q	x	x
⊗ LENVI2011	Méthodes d'évaluation et de gestion environnementale	Jean-Pierre Tack	30h	3 Credits	2q	x	x
○ LBIRA2101A	Biométrie: analyse de la variance	Xavier Draye Bernadette Govaerts	22h+10h	3 Credits	1q	x	x



**TROPICAL FORESTRY AND DEVELOPMENT (OPTION 16F) [15.0]**

● Mandatory

△ Courses not taught during 2019-2020

⊕ Periodic courses taught during 2019-2020

⊗ Optional

⊖ Periodic courses not taught during 2019-2020

■ Activity with requisites

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

Year

1 2

**o Contenu:**

● LBRAI2103	Phytotechnie tropicale	Pierre Bertin	30h	3 Credits	1q	x	
● LBRAI2214	Enquête et pratiques d'intervention en milieu rural tropical	Philippe Baret Pierre Defourny (coord.) Anne Legrève	15h+15h	3 Credits	1q		x

**o Courses to be chosen for 9 credits minimum amongst the following list:**

⊗ LBIRA2109A	Agrarian systems and farm : partim	Pierre Bertin	22.5h +7.5h	3 Credits	1q	x	x
⊗ LBIRE2204	Territorial diagnostic and decision aid ■	Pierre Defourny	22.5h	3 Credits	2q	x	x
⊗ LBIRF2203	Pisciculture	Xavier Rollin	30h	3 Credits	1q	x	x
⊗ LBRAI2104	Tropical zootechnology	Jean-Paul Dehoux	30h	3 Credits	1q	x	x
⊗ LBRAI2110	Elements of Agroecology	Philippe Baret (coord.) Olivier Baudry (compensates) Philippe Baret Olivier Baudry (compensates) Claude Bragard Pierre Bertin Claude Bragard	30h	3 Credits	1q	x	x
⊗ LBRAI2212	Economics of Rural Development	Frédéric Gaspard (coord.) Goedele Van den Broeck	30h	3 Credits	1q	x	x
⊗ LBRES2203	Soil management and planning in warm regions	Charles Biolders (coord.) Bruno Delvaux	22.5h +7.5h	3 Credits	2q	x	x
⊗ LDROP2061	Sustainable Development Law	Charles-Hubert Born	30h	5 Credits	2q	x	x
⊗ LGEO2110	Mondialisation, développement et environnement	Eric Lambin	30h+30h	5 Credits	1q	x	x

## INFORMATION ANALYSIS AND MANAGEMENT IN BIOLOGICAL ENGINEERING (OPTION 10F) [15.0]

○ Mandatory

△ Courses not taught during 2019-2020

⊕ Periodic courses taught during 2019-2020

⊗ Optional

⊖ Periodic courses not taught during 2019-2020

■ Activity with requisites

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

Year

1 2

### o Contenu:

○ LBRTI2102	Process-based modelling in bioscience engineering	Emmanuel Hanert	30h+15h	5 Credits	1q	x	
○ LBRTI2202	Special questions in information management ■	Patrick Bogaert (coord.) Emmanuel Hanert	30h	3 Credits	2q		x

### o Courses to be chosen for 7 credits minimum amongst the following list:

⊗ LBIRA2101A	Biométrie: analyse de la variance	Xavier Draye Bernadette Govaerts	22h+10h	3 Credits	1q	x	x
⊗ LBRAI2101	Population and quantitative genetics	Philippe Baret (coord.) Xavier Draye	30h+7.5h	3 Credits	1q	x	x
⊗ LECGE1333	Game theory and information in economics	Julio Davila Muro Pierre Dehez	30h+10h	5 Credits	2q	x	x
⊗ LELEC2870	Machine Learning : regression, dimensionality reduction and data visualization	John Lee (compensates Michel Verleysen) Michel Verleysen	30h+30h	5 Credits	1q	x	x
⊗ LELEC2920	Communication networks	Benoît Macq	30h+30h	5 Credits	1q	x	x
⊗ LGEO2130	Fundamentals of geographic and environmental modelling	Eric Deleersnijder Jean-François Remacle (compensates Eric Deleersnijder) Sophie Vanwambeke	30h+30h	5 Credits	2q	x	x
⊗ LDEMO2220A	Population models and projections (Part A)		15h+5h	2 Credits	1q	x	x
○ LINFO1225	Conception orientée objet et gestion de données	Kim Mens	30h+30h	5 Credits	2q	x	x
⊗ LINGI1122	Program conception methods	Charles Pecheur	30h+30h	5 Credits	2q	x	x
⊗ LDEMO2220B	Population models and projections (Part B)		25h+15h	5 Credits	1q	x	x
⊗ LPHYS2162	Introduction to the physics of the climate system and its modelling	Hugues Goosse Jean-Pascal van Ypersele de Strihou	22.5h +22.5h	5 Credits	1q	x	x
⊗ LPHYS2267	Paleoclimate dynamics and modelling	Qiuzhen Yin	22.5h +7.5h	5 Credits	2q	x	x
⊗ LSINF2275	Data mining & decision making	Marco Saerens	30h+15h	5 Credits	2q	x	x
⊗ LSTAT2020	Statistical softwares and basic statistical programming	Céline Bugli	15h+15h	4 Credits	1q	x	x
⊗ LSTAT2120	Linear models	Christian Hafner	30h+7.5h	5 Credits	1q	x	x
⊗ LSTAT2350	Data Mining	Tim Verdonck	15h+15h	5 Credits	2q	x	x

**BUSINESS CREATION (OPTION 13F) [20.0]**

● Mandatory

△ Courses not taught during 2019-2020

⊕ Periodic courses taught during 2019-2020

⊗ Optional

⊖ Periodic courses not taught during 2019-2020

■ Activity with requisites

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

When chosen, the students are exempted from two courses among the mandatory courses: BIRE2210 and BIRE2106A. Access is limited via a selection process when entering the master programme. <http://www.uclouvain.be/cpme> ou [cpme@uclouvain.be](mailto:cpme@uclouvain.be)

Year

1 2

**o Contenu:**

● LCPME2001	Entrepreneurship Theory (in French)	Blanche Havenne (compensates Frank Janssen) Frank Janssen	30h+20h	5 Credits	1q	x	
● LCPME2002	Managerial, legal and economic aspects of the creation of a company (in French)	Yves De Cordt Marine Falize	30h+15h	5 Credits	1q	x	x
● LCPME2003	Business plan of the creation of a company (in French)	Frank Janssen	30h+15h	5 Credits	2q	x	x
● LCPME2004	Advanced seminar on Entrepreneurship (in French)	Frank Janssen	30h+15h	5 Credits	2q	x	x

**Course prerequisites**

A document entitled [en-prerequis-2019-birf2m.pdf](#) specifies the activities (course units - CU) with one or more pre-requisite(s) within the study programme, that is the CU whose learning outcomes must have been certified and for which the credits must have been granted by the jury before the student is authorised to sign up for that activity.

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

As the prerequisites are a requirement of enrolment, there are none within a year of a course.

The prerequisites are defined for the CUs for different years and therefore influence the order in which the student can enrol in the programme's CUs.

In addition, when the panel validates a student's individual programme at the beginning of the year, it ensures the consistency of the individual programme:

- It can change a prerequisite into a corequisite within a single year (to allow studies to be continued with an adequate annual load);
- It can require the student to combine enrolment in two separate CUs it considers necessary for educational purposes.

For more information, please consult [regulation of studies and exams](#).

**The programme's courses and learning outcomes**

For each UCLouvain training programme, a [reference framework of learning outcomes](#) specifies the competences expected of every graduate on completion of the programme. You can see the contribution of each teaching unit to the programme's reference framework of learning outcomes in the document "*In which teaching units are the competences and learning outcomes in the programme's reference framework developed and mastered by the student?*"

The document is available by clicking [this link](#) after being authenticated with your UCLouvain account.

## BIRF2M - Information

### Admission

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

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

#### SUMMARY

- > [University Bachelors](#)
- > [Non university Bachelors](#)
- > [Holders of a 2nd cycle University degree](#)
- > [Holders of a non-University 2nd cycle degree](#)
- > [Adults taking up their university training](#)
- > [Access on the file](#)
- > [Admission and Enrolment Procedures for general registration](#)

### University Bachelors

Diploma	Special Requirements	Access	Remarks
<b>UCLouvain Bachelors</b>			
<a href="#">Bachelor in Bioengineering</a>		Direct Access	
Autre Bachelier du domaine des sciences et technologies		Based on application: accepted, conditional on further training, or refusal	Le ou la futur-e étudiant-e rencontrera obligatoirement le <a href="#">Conseiller aux études</a> qui examinera son dossier.
<b>Others Bachelors of the French speaking Community of Belgium</b>			
Tous les bacheliers de la CfB		Direct Access	
		Based on application: accepted, conditional on further training, or refusal	
<b>Bachelors of the Dutch speaking Community of Belgium</b>			
		Based on application: accepted, conditional on further training, or refusal	
		Based on application: accepted, conditional on further training, or refusal	
<b>Foreign Bachelors</b>			
		Based on application: accepted, conditional on further training, or refusal	

### Non university Bachelors

> Find out more about [links](#) to the university

Diploma	Access	Remarks
BA en agronomie (techniques et gestion agricoles) - EPS - crédits supplémentaires entre 45 et 60	Les enseignements supplémentaires éventuels peuvent être consultés dans <a href="#">le module complémentaire</a> .	Type court
BA en agronomie (toutes orientations) - HE - crédits supplémentaires entre 45 et 60		
BA en chimie (biochimie, biotechnologie, chimie appliquée) - EPS - crédits supplémentaires entre 45 et 60		
BA en chimie (biochimie, biotechnologie, chimie appliquée, environnement) - HE - crédits supplémentaires entre 45 et 60		

## Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
<b>"Licenciés"</b>			
Bioingénieur		Based on application: accepted, conditional on further training, or refusal	
<b>Masters</b>			
Master Bioingénieur : sciences et technologies de l'environnement		Based on application: accepted, conditional on further training, or refusal	

## Holders of a non-University 2nd cycle degree

### Adults taking up their university training

> See the website [Valorisation des acquis de l'expérience](#)

It is possible to gain admission to all masters courses via the validation of professional experience procedure.

### Access on the file

Reminder : all Masters (apart from Advanced Masters) are also accessible on file.

## Admission and Enrolment Procedures for general registration

## Supplementary classes

**To enrol for this Masters, the student must have a good command of certain subjects. If this is not the case, they must add preparatory modules to their Master's programme.**

○ Mandatory

△ Courses not taught during 2019-2020

⊕ Periodic courses taught during 2019-2020

⊗ Optional

⊖ Periodic courses not taught during 2019-2020

■ Activity with requisites

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

### ○ Cours passerelle pour le master en bioingénieur, orientation chimie gestion des forêts et espaces naturels ET sciences et technologies de l'environnement (44 credits)

○ LBIR1315	Probability and statistics II	Patrick Bogaert	22.5h+22.5h	3 Credits	1q
○ LBIR1351	Introduction to systems analysis	Philippe Baret	10h+20h	3 Credits	1q
○ LBIR1325A	Transfert de fluides et d'énergie pour les bioingénieurs: partim A	Yann Bartosiewicz Mathieu Javaux Mamik Vanclooster	37.5h+22.5h	5 Credits	1q
○ LBIR1349	Chimie analytique I	Christine Dupont (coord.) Yann Garcia	30h+15h	3 Credits	1q
○ LBIR1350	General Microbiology	Jacques Mahillon	37.5h+15h	4 Credits	2q
○ LBIR1360	Firm management and organisation	Pierre De Muelenaere	30h+7.5h	3 Credits	1q
○ LANGL2480	English Communication Skills for Bioengineers	Ahmed Adriouche Maité Dupont Dominique François Sandrine Meirlaen Mark Theodore Pertuit Charlotte Peters Adrien Pham (coord.) Françoise Stas Anne-Julie Toubeau	30h	2 Credits	2q
○ LBIR1328	Climatology and hydrology applied to agronomy and the environment	Charles Bielders Hugues Goosse Mamik Vanclooster (coord.)	45h+22.5h	6 Credits	1q
○ LBIR1362	Environmental Economics	Frédéric Gaspart	30h+7.5h	3 Credits	2q
○ LBIR1336	Sciences du sol et excursions intégrées	Yannick Agnan (coord.) Richard Lambert Caroline Vincke	30h+37.5h	5 Credits	2q
○ LBIR1334	Introduction to forestry sciences	Quentin Ponette (coord.) Caroline Vincke	22.5h+15h	3 Credits	2q
○ LBIR1325B	Transferts de fluide et d'énergie pour les bioingénieurs (partim B): Case studies	Yann Bartosiewicz Mathieu Javaux Mamik Vanclooster	0h+30h	2 Credits	2q
○ LBIR1354	Biologie des interactions	Anne-Laure Jacquemart (coord.) Anne Legrève	22.5h+15h	3 Credits	2q

### ○ Cours spécifiques (11 credits)

○ LBIR1260	Principles of economics	Goedele Van den Broeck	30h+15h	4 Credits	1q
○	Activités au choix libre <i>The students have a free choice of courses within one of the bachelor programs in Sciences and Technology Sector : <a href="https://uclouvain.be/fr/etudier/les-facultes.html">https://uclouvain.be/fr/etudier/les-facultes.html</a></i>			6 Credits	



## Teaching method

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The interdisciplinary nature, integrated approach and the ability to reason on long-term issues are key dimensions in the training of **bioengineers in forests and natural areas**. This is reflected by:

- grouping of training activities: combined exercises, joint projects, case studies, weekly excursions, forestry tour (a one week study trip in Belgium and/or abroad), visits to companies;
- the integration of various approaches and tools (field observations, laboratory analyses, data bases, information systems, permanent experimental plots, ...), on different spatial scales (from a tree to a catchment basin, from a regional level to a sub-continental level) and temporal scales;
- student teamwork, training students to share their skills;
- the transversal educational offer (organized by other faculties).

### A full array of pedagogical tools is placed at the students' disposal.

The Louvain-la-Neuve campus includes a 200 ha forest which is owned by UCL: the Bois de Lauzelle. The forest serves as a model for the scientific, pedagogical, economical, ecological and recreational functions of a wood. Several special devices have been put in place in the Bois de Lauzelle that are used both for its daily management as well as for educational purposes. An example is the simulation area for the marking of trees, which, combined with a computer programme, allows to analyse the effects of the choices made during the process; but also a permanent inventory device for ligneous resources. Students learn to recognise ligneous species more easily thanks to the diversity of the species present on the site, both in the Bois de Lauzelle and in town. Students also have access to an arboretum of coniferous species.

The Forestry Department also manages various experimental devices in the Walloon and Brussels regions. These provide students with the opportunity to train themselves in the understanding and management of forest ecosystems.

A decentralised field laboratory, the "Centre de développement Agro-Forestier (CDAF)", conducts applied research on trees and forests. Situated in Chimay, the laboratory gives access to a great diversity of natural environments. It also accommodates students in the framework of internships and dissertations.

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 environment science and land development;
- presentation of seminars by students within the research groups, during their master dissertation.

The application of skills, knowledge and techniques that students have acquired and how they use them together is taken into account in the realisation of an integrated project as well as during the "forestry tour". This one week field trip during the second year, allows students to gain practical experience. These are important learning activities in addition to the realisation of a 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. 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

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***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 regulations of the programme and 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

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The Master in Forests and Natural Areas 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 comprehensive University. The shape of the elective modules available has also been influenced by the different fields of activity in which bioengineers work.

There are two kinds of international mobility: students who have already gained their Bachelor degree can move abroad to study for their Master at another institution; it is also possible to take some course modules in another institution. The mobility rate for AGRO students on exchange schemes such as Erasmus is around 30-40%, depending on the year.

This mobility should increase given the harmonization of education at the European level and the conclusion of new partnership agreements outside ERASMUS as well as membership of thematic networks. The AGRO Faculty is also a member of the ATHENS network.

The Master in Forests and Natural Areas proposes privileged exchanges with the following institutions:

1. Université de Moncton, Edmunston campus, Faculté de Foresterie (Canada)
2. Universidad politecnica de Madrid (Spain)
3. Institut Polytechnique LaSalle Beauvais (France)
4. Ecole Nationale du Génie Rural, des Eaux et des Forêts (Nancy, France)
5. Ecole Nationale Forestière d'Ingénieurs (Salé, Morocco)

The Réseau des Ingénieurs Forestiers de Louvain (RIFL) creates possibilities for project-based student mobility.

## Possible trainings at the end of the programme

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The Master in Bioengineering programme follows on the Bachelor in Engineering (Bioengineering) with a minor in Environment. Access to this Master is also possible after a minor in Agronomy, providing a small adaptation of the programme that must be validated by the academic secretary.

Successful completion of this programme enables direct entry to other training programmes in the second and third cycles.

- Advanced Masters: the Advanced Masters in the field authorized by regulations in addition to those established by the University Development Commission (Commission Universitaire au Développement CUD) in the same field.
- Doctoral programmes: PHD in Agronomy and Bioengineering

## Contacts

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### Curriculum Management

Faculty

Structure entity

Denomination

Sector

Acronym

Postal address

SST/AGRO

Faculty of bioscience engineering (AGRO)

Sciences and Technology (SST)

AGRO

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<http://www.uclouvain.be/agro>

Web site

Mandate(s)

- Doyen : Philippe Baret
- Directeur administratif de faculté : Christine Denayer

Commission(s) of programme

- Commission de programme - Master Bioingénieur-Sciences agronomiques (BIRA)
- Commission de programme - Master Bioingénieur-Chimie et bioindustries (BIRC)
- Commission de programme - Master Bioingénieur-Sciences & technologies de l'environnement (BIRE)
- Commission de programme - Bachelier en sciences de l'ingénieur, orientation bioingénieur (CBIR)
- Commission de programme interfacultaire en Sciences et gestion de l'environnement (ENVI)
- Fermes universitaires de Louvain (FERM)

Academic supervisor: [Quentin Ponette](#)

Jury

- Président: [Charles Bielders](#)
- Secrétaire de jury 2ième année de master: [Quentin Ponette](#)

Useful Contact(s)

- Conseiller aux études: [Eric Gaigneaux](#)

