BIRF2M

2014 - 2015

Master [120] in Forests and Natural Areas Engineering

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**
Organized by: **Faculté des bioingénieurs (AGRO)**
Programme code: **birf2m** - European Qualifications Framework (EQF): 7

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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 Bioscience 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 tackles 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.

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[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.

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[1] The tools are explained on the basis of the radioscopy 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 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:

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 (BIR**C**13BA, BIR**A**13BA, BIR**E**13BA): 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 â€œBusiness Creationâ€# 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 â€œBusiness Creationâ€# 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 Masterâ€™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 Masterâ€™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://www.uclouvain.be/cpme.html

Whatever the focus or the options chosen, the programme of this master shall totalize 120 credits, spread over two years of studies each of 60 credits.

> Tronc commun *[en-prog-2014-birf2m-lbirf200t.html]*

> Professional focus *[en-prog-2014-birf2m-lbirf200s]*

Options courses

> Ecosystems and Biodiversity (Option 14F) *[en-prog-2014-birf2m-lbirf201o.html]*
> Forest and Society (Option 15F) *[en-prog-2014-birf2m-lbirf202o.html]*
> Tropical Forestery and Development (Option 16F) *[en-prog-2014-birf2m-lbirf203o.html]*
> Information Analysis and Management in Biological Engineering (Option 10F) *[en-prog-2014-birf2m-lbirf204o.html]*
> Business Creation (Option 13F) *[en-prog-2014-birf2m-lbirf205o.html]*

BIRF2M Detailled programme

Programme by subject

CORE COURSES [75.0]

O Mandatory	⊠ Optional
△ Courses not taught during 2014-2015	⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015	⧺ Two years course

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

Les étudiants qui choisissent l'option Création d'entreprise (13F) réalisent leur mémoire dans le cadre de la formation interdisciplinaire CPME.

						Year 1	2
O LBIRF2200	Mémoire de fin d'études	N.		27 Credits			x
O LBIRE2210	Master thesis' accompanying seminar	Charles Bielders, Patrick Bogaert (coord.), Jacques Mahillon, Caroline Vincke	30h	3 Credits	1 + 2q		x
O LBIRF2212	Projet d'aménagement forestier intégré	Anne-Laure Jacquemart, Quentin Ponette (coord.), Caroline Vincke	50h	5 Credits	1q		x
O LBIRF2213	Tournée forestière	Anne-Laure Jacquemart, Quentin Ponette (coord.), Caroline Vincke	30h	3 Credits	2q		x
O *Ecologie et santé des forêts*							
O LBRPP2103B	Phytopathologie: Santé des forêts	Claude Bragard, Anne Legrève	22.5h	2 Credits		x	
O *Sciences humaines*							
O LBIRF2201	Economie et politique forestières	Christine Farcy, Marc Herman, Mathieu Jonard (coord.)	37.5h	3 Credits	1q	x	
O LDROP2061	Sustainable Development Law	Francis Haumont	30h	3 Credits	2q	x	x

					Year 1	Year 2

Religious Sciences: one course to choose among the following: (2 credits)

⊠ LTECO2100	Questions of religious sciences: Biblical readings	Hans Ausloos	15h	2 Credits	1q	x	x
⊠ LTECO2200	Questions of religious sciences: reflections about Christian faith	Dominique Martens	15h	2 Credits	2q	x	x
⊠ LTECO2300	Questions of religious sciences: questions about ethics	Philippe Cochinaux	15h	2 Credits	1q	x	x

Sciences de l'ingénieur

LBIRE2102	Applied Geomatic	Pierre Defourny	30h +22.5h	4 Credits	1q	x	
LBIRF2101	Dendrométrie et inventaires des ressources forestières	Quentin Ponette	30h +22.5h	4 Credits	2q	x	
LBIRF2103	Anatomie et propriétés des bois	Caroline Vincke	30h+30h	4 Credits	1q	x	
LBIRE2106A	Topométrie et photogrammétrie: partie Topométrie	Sébastien Lambot	15h+7.5h	2 Credits	2q	x	

Gestion des milieux naturels - aménagement forestier

LBIRF2106	Gestion des habitats et des espèces	Anne-Laure Jacquemart (coord.), Alain Licoppe, Nicolas Titeux	22.5h +22.5h	4 Credits	1q		x
LBIRF2202	Aménagement des formations forestières tempérées et tropicales	Christine Farcy, Sylvie Gourlet, Quentin Ponette (coord.)	45h+15h	6 Credits	1q		x

Aménagement du territoire

LBRAT2101B	Aménagement du territoire: Principes	Yves Hanin, Anne-Laure Jacquemart	45h	3 Credits	1q	x	x

PROFESSIONAL FOCUS [30.0]

Mandatory	⊠ Optional
△ Courses not taught during 2014-2015	⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015	⧺ Two years course

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

					Year 1	Year 2

Sciences de l'ingénieur

Statistique: un cours au choix parmi les intitulés suivants : (3 credits)

⊠ 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, Anouar El Ghouch, Bernadette Govaerts	22h+10h	3 Credits	1q	x	
LBIRE2103	General hydrology	Charles Bielders, Marnik Vanclooster (coord.)	30h +22.5h	5 Credits	1q	x	

						Year 1	2
LBIRE2104	Applied soil sciences	Jean-Thomas Cornélis (compensates Bruno Delvaux), Bruno Delvaux	30h +22.5h	5 Credits	2q	x	
LBIRF2102	Génie forestier et transformation du bois	Caroline Vincke	45h+7.5h	5 Credits	2q	x	

Ecologie et santé des forêts

LBIRF2104	Ecologie forestière et phytosociologie	Anne-Laure Jacquemart, Quentin Ponette (coord.), Caroline Vincke	37.5h +22.5h	6 Credits	2q	x	

Gestion des milieux naturels

LBIRF2105	Sylviculture et dendrologie	Quentin Ponette	30h +52.5h	6 Credits	1q	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-2014-birf2m-lbirf201o]
> Forest and Society (Option 15F) [en-prog-2014-birf2m-lbirf202o]
> Tropical Forestery and Development (Option 16F) [en-prog-2014-birf2m-lbirf203o]
> Information Analysis and Management in Biological Engineering (Option 10F) [en-prog-2014-birf2m-lbirf204o]
> Business Creation (Option 13F) [en-prog-2014-birf2m-lbirf205o]

ECOSYSTEMS AND BIODIVERSITY (OPTION 14F) [15.0]

O Mandatory
⊠ Optional
△ Courses not taught during 2014-2015
⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015
╪ Two years course

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

Students choosing to do an internship will have to select the courses LBIR2000A and LBIR2000B in their programme.

						Year 1	Year 2
O LBRAT2101C	Aménagement du territoire: Etude de cas	Yves Hanin, Anne-Laure Jacquemart	0h+22.5h	3 Credits	1q	x	
O LSTAT2110A	Analyse des données	Christian Hafner, Johan Segers	15h+7.5h	3 Credits	1q	x	

O *Compléments d'écologie: minimum deux cours au choix parmi les intitulés suivants:*

⊠ LBIRF2203	Pisciculture	Xavier Rollin	30h	3 Credits	1q	x	x
⊠ LBIRE2105	Water and soil quality	Henri Halen, Xavier Rollin (coord.)	30h+7.5h	3 Credits	2q	x	
⊠ LBOE2140	Ecologie du paysage	Hans Van Dyck	24h+24h	4 Credits	1q		x
⊠ LBOE2120	Conservation de la biodiversité	Nicolas Schtickzelle, Hans Van Dyck	36h+12h	4 Credits	1q	x	x
⊠ LBOE2160	Ecologie des interactions	Thierry Hance, Anne-Laure Jacquemart	24h	2 Credits	1q	x	x
⊠ LBOE2148	Ecologie microbienne	Stephan Declerck	24h	2 Credits	1q	x	x
⊠ LBIR2000A	Masters internship: part A	N.		5 Credits			x

O *Diagnostic, aide à la décision et modélisation: minimum un cours au choix parmi les intitulés suivants:*

Le cours LBIRA2101A ou le cours LBIRE2101 sera choisi en fonction du cours déjà suivi en statistique dans le cadre de la finalité spécialisée.

⊠ LENVI2011	Méthodes d'évaluation et de gestion environnementale	Jean-Pierre Tack	30h	3 Credits	2q	x	x
⊠ LBRTI2102	Process modelling and forescasting systems	Emmanuel Hanert	30h+15h	5 Credits	1q	x	x
⊠ LBIRE2101	Statistical analysis of spatial and temporal data	Patrick Bogaert	22.5h +15h	3 Credits	2q	x	x
⊠ LBIRE2204	Territorial diagnostic and decision aid	Pierre Defourny (coord.), Frédéric Gaspart, Jean-Paul Malingreau	22.5h	3 Credits	2q	x	x
⊠ LBIRE2205	Decision Tools and Project Management	Olivier Cogels, Frédéric Gaspart (coord.)	30h+7.5h	3 Credits	1q	x	x

						Year 1	2
⊠ LBIRA2101A	Biométrie: analyse de la variance	Xavier Draye, Anouar El Ghouch, Bernadette Govaerts	22h+10h	3 Credits	1q	x	x
⊠ LBIR2000B	Masters internship: part B	N.		5 Credits			x

FOREST AND SOCIETY (OPTION 15F) [15.0]

O Mandatory	⊠ Optional
△ Courses not taught during 2014-2015	⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015	⧺ Two years course

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

Students choosing to do an internship will have to select the courses LBIR2000A AND LBIR2000B together.

O Aide à la décision et modélisation: minimum un cours au choix parmi les intitulés suivants:

Le cours LBIRA2101A ou le cours LBIRE2204 sera choisi en fonction du cours déjà suivi en statistique dans le cadre de la finalité spécialisée.

						Year 1	Year 2
⊠ LBRAT2102	Spatial modelling of territorial dynamics	Pierre Defourny	15h+15h	3 Credits	2q	x	x
⊠ LBRTI2102	Process modelling and forescasting systems	Emmanuel Hanert	30h+15h	5 Credits	1q	x	x
⊠ LENVI2011	Méthodes d'évaluation et de gestion environnementale	Jean-Pierre Tack	30h	3 Credits	2q	x	x
⊠ LSTAT2110A	Analyse des données	Christian Hafner, Johan Segers	15h+7.5h	3 Credits	1q	x	x
⊠ LBIRE2101	Statistical analysis of spatial and temporal data	Patrick Bogaert	22.5h +15h	3 Credits	2q	x	x
⊠ LBIRE2205	Decision Tools and Project Management	Olivier Cogels, Frédéric Gaspart (coord.)	30h+7.5h	3 Credits	1q	x	x
⊠ LBIRE2204	Territorial diagnostic and decision aid	Pierre Defourny (coord.), Frédéric Gaspart, Jean-Paul Malingreau	22.5h	3 Credits	2q	x	x
⊠ LBIRA2101A	Biométrie: analyse de la variance	Xavier Draye, Anouar El Ghouch, Bernadette Govaerts	22h+10h	3 Credits	1q	x	x
⊠ LBIR2000A	Masters internship: part A	N.		5 Credits			x

O Sciences humaines et droit: minimum un cours au choix parmi les intitulés suivants:

⊠ LBIRA2105	Agricultural and rural policies	Bruno Henry de Frahan	30h	3 Credits	1q	x	x
⊠ LENVI2006	Sociologie de l'environnement	Françoise Bartiaux	15h+15h	3 Credits	2q	x	x
⊠ LBRAT2103	Rural sociology and land development	Daniel Bodson	30h	3 Credits	1q	x	x
⊠ LBRAI2210	Microeconomics of Development	Frédéric Gaspart	30h	3 Credits	1q	x	x
⊠ LBRTI2203	Communication scientifique dans le domaine des sciences exactes	Pascale Gualtieri (coord.), Joël Saucin	30h	3 Credits	1q	x	x
⊠ LDROP2063	Environmental Law	Nicolas de Sadeleer, Damien Jans	30h	3 Credits	2q	x	x
⊠ LESPO2103	Environment and Global Economy	Thierry Bréchet	30h	5 Credits		x	x
⊠ LBIR2000B	Masters internship: part B	N.		5 Credits		x	x

TROPICAL FORESTERY AND DEVELOPMENT (OPTION 16F) [15.0]

O Mandatory	⊠ Optional
△ Courses not taught during 2014-2015	⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015	⧺ Two years course

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

Students chosing to do an internship will have to select LBIR2000A AND LBIR200B.

						Year 1	Year 2
O LBIRA2109F	Systèmes agraires: parties 1 et 2	Pierre Bertin	35h+7.5h	4 Credits	1q	x	x
O *Gestion des agrosystèmes: minimum un cours au choix parmi les intitulés suivants:*							
⊠ LBRAI2103	Rural sociology and land use	Pierre Bertin	30h	3 Credits	1q		x
⊠ LBRES2203	Soil management and planning in warm regions	Charles Bielders (coord.), Bruno Delvaux, Hugues Titeux (compensates Bruno Delvaux)	22.5h +7.5h	3 Credits	1q	x	x
⊠ LBRAI2104	Tropical zootechnology	Jean-Paul Dehoux	30h	3 Credits	1q	x	x
⊠ LBIRF2203	Pisciculture	Xavier Rollin	30h	3 Credits	1q	x	x
⊠ LBIR2000A	Masters internship: part A	N.		5 Credits		x	x
O *Sciences politiques et sociales: minimum deux cours au choix parmi les intitulés suivants:*							
⊠ LDVLP2325	Geopolitics of natural ressources	Vincent Legrand	30h	5 Credits	1q	x	x
⊠ LBRAI2210	Microeconomics of Development	Frédéric Gaspart	30h	3 Credits	1q	x	x
⊠ LBRAI2212	Economics of Rural Development	Frédéric Gaspart (coord.), Bruno Henry de Frahan	30h	3 Credits	1q	x	x
⊠ LBRAI2214	Enquête et pratiques d'intervention en milieu rural tropical	Philippe Baret, Claude Bragard (coord.), Pierre Defourny	15h+15h	3 Credits	1q	x	x
⊠ LGEO2110	Mondialisation, développement et environnement	Eric Lambin	30h+30h	5 Credits	1q	x	x
⊠ LENVI2006	Sociologie de l'environnement	Françoise Bartiaux	15h+15h	3 Credits	2q	x	x
⊠ LBIRE2204	Territorial diagnostic and decision aid	Pierre Defourny (coord.), Frédéric Gaspart, Jean-Paul Malingreau	22.5h	3 Credits	2q	x	x
⊠ LBIR2000B	Masters internship: part B	N.		5 Credits		x	x

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

O Mandatory	⊠ Optional
△ Courses not taught during 2014-2015	⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015	⧺ Two years course

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

It is highly recommended to the student choosing this option to replace in the main programme the course LBIRF2212 by LBIRE2211. Two courses minumum to be chosen amongst the suggested list. Student doing an internship will have to enrol to both partims LBIR2000A and LBIR2000B.

						Year 1	Year 2
⊠ LBRTI2102	Process modelling and forescasting systems	Emmanuel Hanert	30h+15h	5 Credits	1q	x	
⊠ LBRTI2202	Special questions in information management	Patrick Bogaert (coord.), Emmanuel Hanert	30h	3 Credits	2q		x
⊠ LBIR2000A	Masters internship: part A	N.		5 Credits			x

O *Course to be chosen to reach the 15 credits of the option.*

⊠ LBIR2000B	Masters internship: part B	N.		5 Credits			x
⊠ LBIRA2101A	Biométrie: analyse de la variance	Xavier Draye, Anouar El Ghouch, Bernadette Govaerts	22h+10h	3 Credits	1q	x	x
⊠ LBRAI2101	Population and quantitative genetics	Philippe Baret (coord.), Xavier Draye	45h	4 Credits	1q	x	x
⊠ LSINF2224	Programming methods	Charles Pecheur	30h+15h	5 Credits	2q	x	x
⊠ LINGI1122	Program conception methods	José Vander Meulen	30h+30h	5 Credits	2q	x	x
⊠ LGEO2130	Geographic modelling	Eric Deleersnijder, Sophie Vanwambeke	30h+30h	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
⊠ LSINF2275	Data mining & decision making	Marco Saerens	30h+30h	5 Credits	2q	x	x
⊠ LSTAT2120	Linear models	Christian Hafner	22.5h +7.5h	5 Credits	1q	x	x
⊠ LSTAT2350	Data Mining	Libei Chen	15h+15h	5 Credits	2q	x	x
⊠ LDEMO2220A	Population models and projections (Part A)	N.	15h+5h	2 Credits	1q	x	x
⊠ LDEMO2220B	Population models and projections (Part B)	N.	25h+15h	5 Credits	1q	x	x
⊠ LPHY2153	Introduction à la physique du système climatique et à sa modélisation	Hugues Goosse (compensates Jean-Pascal van Ypersele de Strihou), Hugues Goosse, Jean-Pascal van Ypersele de Strihou	30h+15h	5 Credits	1q	x	x
⊠ LPHY2252	Compléments de modélisation du système climatique	Michel Crucifix, Thierry Fichefet, Hugues Goosse, Qiuzhen Yin	45h+7.5h	6 Credits	2q	x	x
⊠ LECGE1333	Game theory and the information economy	Pierre Dehez (compensates Julio Davila Muro)	30h+10h	5 Credits	2q	x	x
⊠ LSTAT2020	Statistical computing	Céline Bugli	20h+20h	6 Credits	1q	x	x
⊠ LSINF1225	Object-oriented design and data management	Kim Mens	30h+30h	5 Credits	2q	x	x

BUSINESS CREATION (OPTION 13F) [20.0]

O Mandatory	⊠ Optional
△ Courses not taught during 2014-2015	⊘ Periodic courses not taught during 2014-2015
⊕ Periodic courses taught during 2014-2015	⧺ Two years course

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

						Year 1	Year 2
O LCPME2001	Entrepreneurship Theory (in French)	Frank Janssen	30h+20h	5 Credits	1q	x	
O LCPME2002	Managerial, legal and economic aspects of the creation of a company (in French)	Régis Coeurderoy, Yves De Cordt	30h+15h	5 Credits	1q	x	x
O LCPME2003	Business plan of the creation of a company (in French)	Frank Janssen	30h+15h	5 Credits	2q	x	x
O LCPME2004	Advanced seminar on Enterpreneurship (in French)	Frank Janssen	30h+15h	5 Credits	2q	x	x

BIRF2M - Information

Admission

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

1. Être titulaire d'un diplôme universitaire de premier cycle en sciences de l'ingénieur, orientation bioingénieur (voir plus loin)
2. Apporter la preuve d'une maitrise suffisante de la langue française (niveau B1 du Cadre européen commun de référence)

Si le total de prérequis dépasse 15 crédits, l'accès au master est conditionné à la réussite de l'année préparatoire dont le programme est établi sur base du dossier de l'étudiant.

- 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
- Personalized access

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University Bachelors

Diploma	Special Requirements	Access	Remarks
UCL Bachelors			
		Direct access	
Bachelier en sciences de l'ingénieur: orientation bioingénieur	Approfondissement en agronomie	Access with additional training	L'étudiant bachelier en sciences de l'ingénieur, orientation bioingénieur ayant suivi au préalable la mineure d'approfondissement en environnement introduit un dossier auprès du vice-doyen, en mentionnant son curriculum détaillé. La commission propose à l'étudiant maximum 2 cours à rajouter (Introduction aux sciences forestières et/ou économie des ressources naturelles et de l'environnement).
Bachelier en sciences de l'ingénieur: orientation bioingénieur	Approfondissement en chimie	Access with additional training	L'étudiant bachelier en sciences de l'ingénieur, orientation bioingénieur ayant suivi au préalable la mineure d'approfondissement en chimie introduit un dossier auprès du vice-doyen, en mentionnant son curriculum détaillé. La commission propose à l'étudiant un programme adapté. Si le volume de cours dépasse les 15 crédits, une année supplémentaire pourra être envisagée.
Others Bachelors of the French speaking Community of Belgium			
Tous les bacheliers de la CfB		Access with additional training	
Bachelier en Sciences de l'ingénieur, orientation bioingénieur		Access with additional training	L'étudiant bachelier en sciences de l'ingénieur, orientation bioingénieur n'ayant pas suivi au préalable une mineure en environnement ou réputée équivalente introduit un dossier auprès du vice-doyen en mentionnant

			son curriculum détaillé. Une proposition de cours adaptée est faite à l'étudiant en imposant éventuellement 15 crédits complémentaires de formation.
Bachelors of the Dutch speaking Community of Belgium			
		Direct access	
Foreign Bachelors			
		Direct access	

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Non university Bachelors

Diploma	Access	Remarks
> Find out more about links to the university		

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Holders of a 2nd cycle University degree

Diploma	Special Requirements	Access	Remarks
"Licenciés"			
Bioingénieur		On the file: direct access or access with additional training	
Licencié en Sciences biomédicales		On the file: direct access or access with additional training	
Licencié en Géographie		On the file: direct access or access with additional training	
Licencié en Biologie		On the file: direct access or access with additional training	
Licencié en Chimie		On the file: direct access or access with additional training	
		Direct access	
Tous les licenciés		Access with additional training	
Masters			
Master Bioingénieur : sciences et technologies de l'environnement		On the file: direct access or access with additional training	
Master Bioingénieur : sciences agronomiques		On the file: direct access or access with additional training	
Master Bioingénieur : chimie et bioindustries		On the file: direct access or access with additional training	
Master en Sciences géographiques		On the file: direct access or access with additional training	
Master en Sciences chimiques		On the file: direct access or access with additional training	
Master en Biologie des organismes et écologie		On the file: direct access or access with additional training	
Tous les masters		Access with additional training	

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Holders of a non-University 2nd cycle degree

Diploma	Access	Remarks
> Find out more about links to the university		

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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.

Accès selon la procédure de validation des acquis de l'expérience
Consultez le site www.uclouvain.be/vae

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Personalized access

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

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Admission and Enrolment Procedures for general registration

Teaching method

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 devises 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

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

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. Universitad 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 dâ€™Ingénieurs (Salé, Morocco)

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

Possible trainings at the end of the programme

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 â€œAgronomyâ€#, 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 Développment â€“ CUD) in the same field.
- Doctoral programmes: PHD in Agronomy and Bioengineering

Contacts

Curriculum Managment

Entite de la structure AGRO

Sigle	**AGRO**	
Dénomination	Faculté des bioingénieurs	
Adresse	Croix du Sud, 2 bte L7.05.01	
	1348 Louvain-la-Neuve	
	Tél 010 47 37 19 - Fax 010 47 47 45	
Site web	https://www.uclouvain.be/agro	
Secteur	Secteur des sciences et technologies (SST)	
Faculté	Faculté des bioingénieurs (AGRO)	
Mandats	Philippe Baret	Doyen
	Christine Devlesaver	Directeur administratif de faculté
Commissions de 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)	

Academic Supervisor : Quentin Ponette

Jury

Président : **Pierre Bertin**
Secrétaire de jury 1ère année de master : **Anne Legrève**
Secrétaire de jury 2ième année de master : **Quentin Ponette**

Usefull Contacts

Conseiller aux études : **Patrick Bogaert**