



MA-IRBA | 2024-2025

# Master in Agricultural Bioengineering

The 2024-2025 programme is subject to change. It is provided for information purposes only.

## Programme mnemonic

MA-IRBA

> Focus *Professional* : M-IRBAS

## Studies level

Master 120 credits

## Learning language

french

## Schedule

office hours

## Studies category / subcategory

Sciences and technics / Agronomy and bioengineering

## Campus

Plaine

> Skills concerning measurement, analysis and diagnostics for an operational and sustainable implementation of the proposed solutions to solve a complex engineering problem.

In addition, the Master promotes the development of the students' personality (their ethical commitment) and their preparation for responsible citizenship, by allowing them to get involved into decision-making processes of the ULB and the EIB.

## Programme's added value

The Master in Agricultural Bioengineering is a EUR-ACE® labelled programme, like all the EIB Masters. Awarded by the European Network for Accreditation of Engineering Education (ENAE), the European label EUR-ACE® attests the quality of teaching and management of the establishment. It is awarded to engineering schools that meet the quality criteria of the specific EUR-ACE® Framework Standards & Guidelines (EAFSG). It promotes the mobility of students between certified institutions and the professional integration of graduates in Belgium and abroad.

The studies leading to the academic degree of Master in Bioengineering provide students with a unique versatility which rests on the acquisition of general scientific bases in combination with engineering techniques. This versatility facilitates the development of the capacity to integrate multidisciplinary concepts for a comprehensive approach to complex problems and the development of sustainable solutions.

In addition to the general training, the Masters in Bioengineering provide more specific training in three major directions that reflect the main areas of bioengineering activities: agricultural sciences, chemistry and bio-industries, environmental science and technology.

The bioengineer trained at the ULB enjoys a unique interfaculty environment in a multidisciplinary university located in the capital of Europe, near the European institutions. The combination of the Faculty of Sciences and the Brussels School of Engineering is a genuine asset to enhance the versatility of the training.

The Master in Agricultural Engineering at ULB is transverse (not favoring a particular discipline but focused on the links across disciplines). More specifically, it is very open to social sciences in order to take into account a plurality of societal dimensions of

## Programme objectives

The training meets the growing requirements of society, which are reflected in the constant expansion of bioengineering applications. The study programs are rooted in the field of environmental management, agro-ecosystems and all the living-based industrial activities.

The highly multidisciplinary training allows students to develop their creativity and versatility to become operational in various jobs related to engineering and to life sciences.

The Master in agricultural Engineering focuses on natural resources management in order to reconcile conservation and production of a variety of biomasses. It refines knowledge about the functioning of living matter at organisation levels in between those of organisms and the entire biosphere. It helps to develop or enhance the following skills:

- > Designing innovative scientific and technological solutions.
- > Leading scientific research in the field of agricultural sciences.



natural resource management. An important place is therefore naturally devoted to agroecology, the foundations of which are laid down in the three blocks of the BA.

## Teaching methods

The program is divided between compulsory courses, optional courses and internships. It encourages the student to switch between different ways of learning: through lectures, exercises and practical laboratory works or personal projects. In the first year of the Master, one half of the teaching is divided into exercises, practical work, visits and personal work, the other half is devoted to theoretical courses.

In the second year of the Master, learning is reinforced by the Master's Thesis (25 ECTS) which is a thorough research work and by a 12-week internship (15 ECTS). These modules represent almost 60% of the academic year program.

## Succeed in your studies

### Choose

The information and guidance counsellors at the InfOR-études [<https://www.ulb.be/en/studies-info-desk-1>] service will help you choose your studies throughout the year.

### Succeed

Take part in preparatory courses [<https://www.ulb.be/en/studies-info-desk-1>] or get help to succeed [<https://www.ulb.be/en/studies-info-desk-1>], before or during your studies.

### Get help

Apply for financial aid, look for accommodation or a student job, get support [<https://www.ulb.be/fr/aides-services-et-accompagnement/aid-services-and-support-1>] for your specific needs.

## International/Openness

The Brussels Bioengineering School has academic and industrial partnerships at national and international levels that allow student exchanges (Erasmus and internships), the intervention of industry specialists as part of the courses, the organization of site visits and research collaborations. In the Master in Agricultural Bioengineering, this means many Master's theses are carried

out abroad and / or in collaboration with NGOs and agricultural and ecological research institutes working for the common good. The students are very interested in international development cooperation.

## Job opportunities

The training leads to many application areas. Biotechnology industries, environmental management, agriculture and land use planning are sectors in which bioengineer are in high demand and where the profession is experienced as very fulfilling. S(h)e will work for instance in companies, government (national and international) agencies, design offices and consultancies but also in teaching and research.

The studies leading to the academic degree of Master in Bioengineering comply with the legislation on access to the profession and give the holder the professional title of Bioengineer.

The agricultural bioengineers (agronomists) are trained to evolve in a variety of work environments related to natural resources management and sustainable production of a diversity of biomasses (human food but also fodder, timber, fiber, fuel, etc.). They are employed both in private companies and in a variety of government departments, both local and international (relevant examples are the Belgian Technical Cooperation and the European Commission), in design offices, NGOs and international agencies such as FAO.

### Contacts

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### Jury President

Nicolas VERECKEN

### Jury Secretary

Simon Dellicour

# Master in Agricultural Bioengineering

## Focus Professional

The Master in agricultural Engineering is based on the study and management of temperate and tropical agro-ecosystems. It aims to provide students with the essential tools for the ecological characterization of natural and man-made environments. It also teaches the principles of sustainable management of these environments. In this way, this master combines conservation and production aspects because the responsible management of any agro-ecosystem requires perfect knowledge of its ecology. An important place is logically given to agroecology whose foundations are already set up during the bachelor. In the first part of the MA, the focus is on sciences and technologies dedicated to agronomy and ecology. It also allows students to develop personal skills through a Master's thesis and a long-term internship in an industrial or academic context. This master provides access to the third cycle (doctorate).

## Bloc 1 | M-IRBAS | MA-IRBA

### Tronc commun

BING-F4002	<b>Acquisition et analyse de données</b>   Marius GILBERT (Coordinator) and Marc DUFRENE ⌚ 5 credits [lecture: 24h, tutorial classes: 36h] 📅 first term 🗨 French
BING-F4004	<b>Entomologie</b>   Nicolas VEREECKEN (Coordinator) ⌚ 5 credits [lecture: 10h, practical work: 50h] 📅 second term 🗨 French
BING-F4005	<b>Pédologie et mécanique des sols</b>   Thomas DROUET DE LA THIBAUDERIE (Coordinator) and Pierre GERARD ⌚ 5 credits [lecture: 42h, tutorial classes: 12h, practical work: 6h] 📅 first term 🗨 French
BING-F4006	<b>Génétique des populations et amélioration des plantes</b>   Olivier HARDY (Coordinator), Christian HERMANS and Marjolein VISSER ⌚ 5 credits [lecture: 48h, tutorial classes: 6h] 📅 second term 🗨 French
BING-F403	<b>Phytotechnie des grandes cultures en régions tempérées</b>   Julien Louvieux (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 12h, field trips: 8h] 📅 second term 🗨 French
BING-F404	<b>Agroécologie et microbiologie des sols et des plantes</b>   Cécile Thonar (Coordinator) ⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨 French
BING-F415	<b>Agroécologie et systèmes d'élevage</b> ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, field trips: 12h] 📅 second term 🗨 French
BING-F416	<b>Stage d'immersion rural et agroécologie</b>   Marjolein VISSER (Coordinator) and Cécile Thonar ⌚ 5 credits [lecture: 24h, field trips: 36h] 📅 first and second terms 🗨 French
BING-F430	<b>Agroécologie et écologie de la conservation</b>   Nicolas VEREECKEN (Coordinator) and Grégory MAHY ⌚ 5 credits [lecture: 36h, tutorial classes: 12h, project: 12h] 📅 first term 🗨 French
BING-F431	<b>Innovations agroécologiques et production alimentaire</b>   Nicolas VEREECKEN (Coordinator) ⌚ 5 credits [lecture: 36h, practical work: 12h, project: 12h] 📅 first term 🗨 French
BIOL-F412	<b>Biotechnologies animales et végétales</b>   Nathalie VERBRUGGEN (Coordinator) and Benoît VANHOLLEBEKE ⌚ 5 credits [lecture: 36h, project: 24h] 📅 second term 🗨 French
SOCA-D471	<b>Agricultures, ruralités et mondialisation</b>   Laurence ROUDART (Coordinator) and Werner BOSMANS ⌚ 5 credits [lecture: 24h] 📅 first term 🗨 French

# Master in Agricultural Bioengineering

## Focus Professional

### Bloc 2 | M-IRBAS | MA-IRBA

## Tronc commun

MEMO-F513 **Mémoire** | Nicolas VERECKEN (Coordinator) and Simon Dellicour  
⌚ 25 credits [mfe/tfe: 300h] 📅 first and second terms

STAG-F012 **Stage en entreprise en sciences agronomiques** | Nicolas VERECKEN (Coordinator) and Simon Dellicour  
⌚ 15 credits [work placement: 180h] 📅 first and second terms 🗨 French

## Cours optionnels

Cours optionnels pour un total de 20 crédits dont 10 crédits à choisir dans la liste des cours répartis en modules ci-dessous et 10 crédits à choisir dans la rubrique Autre UE.

*A total of ten credits chosen from the following*

### Module: Analyse de données

BING-F535 (optional) **Séminaires d'analyse de données** | Marius GILBERT (Coordinator)  
⌚ 5 credits [tutorial classes: 12h, project: 48h] 📅 second term 🗨 French

### Module: Caractérisation des systèmes tropicaux

BIOL-F4005 (optional) **Social-ecological systems** | Farid DAHDOUH-GUEBAS (Coordinator)  
⌚ 5 credits [lecture: 30h, tutorial classes: 6h, field trips: 12h] 📅 first term 🗨 English

### Module: Ecologie appliquée

BIOL-F4001 (optional) **Behavioural Ecology in natural and man-made environments** | Claire DETRAIN (Coordinator)  
⌚ 5 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨 English

### Module: Ecophysiologie

BIOL-F443 (optional) **Plant responses to environmental stress** | Nathalie VERBRUGGEN (Coordinator)  
⌚ 5 credits [lecture: 24h, project: 24h] 📅 first term 🗨 English

BIOL-F444 (optional) **Plant-soil interactions** | Pierre Jacques MEERTS (Coordinator)  
⌚ 5 credits [lecture: 24h, tutorial classes: 12h] 📅 first term 🗨 English

Ce cours ne sera pas donné en 2023-2024.

### Module: Valorisation des ressources ligno-cellulosiques

BING-H5001 (optional) **Biorefinery: from biomass transformation to biobased products** | David CANNELLA (Coordinator)  
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨 English

### Module: Géomatique

GEOG-F211 (optional) **Systèmes d'information géographique et projections** | Eléonore WOLFF (Coordinator) and Michele D'ADDERIO  
⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 French

GEOG-F425 (optional) **Télédétection** | Eléonore WOLFF (Coordinator)  
⌚ 5 credits [lecture: 30h, practical work: 30h] 📅 first term 🗨 French

## Module: Economie et développement

ECON-O405  
(optional)

**Common agricultural policy** | Giulia MELONI (Coordinator)

🕒 5 credits [lecture: 24h] 📅 first term 🗣️ English

SOCA-D443  
(optional)

**Anthropologie du développement** | Véronique JOIRIS (Coordinator)

🕒 5 credits [lecture: 24h] 📅 second term 🗣️ French

SOCA-D482  
(optional)

**Sécurité alimentaire mondiale** | Laurence ROUDART (Coordinator)

🕒 5 credits [lecture: 24h] 📅 second term 🗣️ French

## Autre UE

Choisir 10 crédits dans la liste des cours à option ci-dessous ou dans les programmes de masters de l'Ecole de Bioingénierie de Bruxelles, de la Faculté des Sciences, de l'Ecole Polytechnique de Bruxelles ou dans le programme des Masters bioingénieurs de la Faculté des Bioingénieurs de l'Université Catholique de Louvain (UCL).

*A total of ten credits chosen from the following*

TEMP-0000  
(optional)

**Cours extérieurs au programme**

🕒 10 credits 📅 academic year 🗣️ French