Université Paris-Saclay

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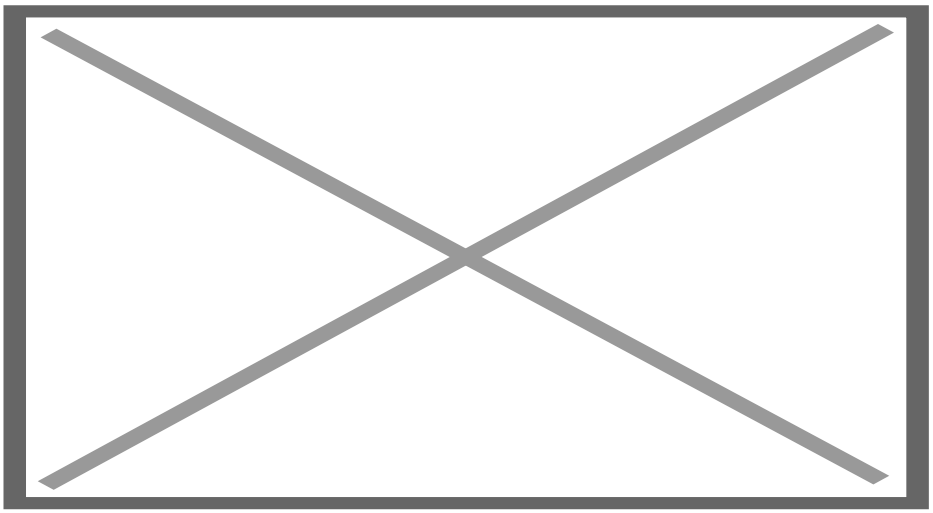
M1 Biomass Engineering for Bioeconomy

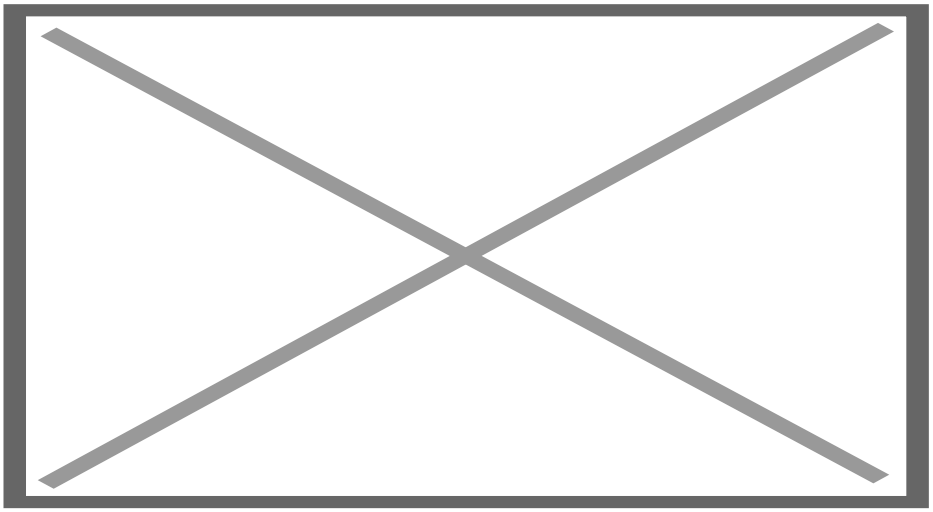
Master's degree
Specialisation Biologie-AgroSciences
Enrolment type
Formation initiale
Language(s) of instruction
English

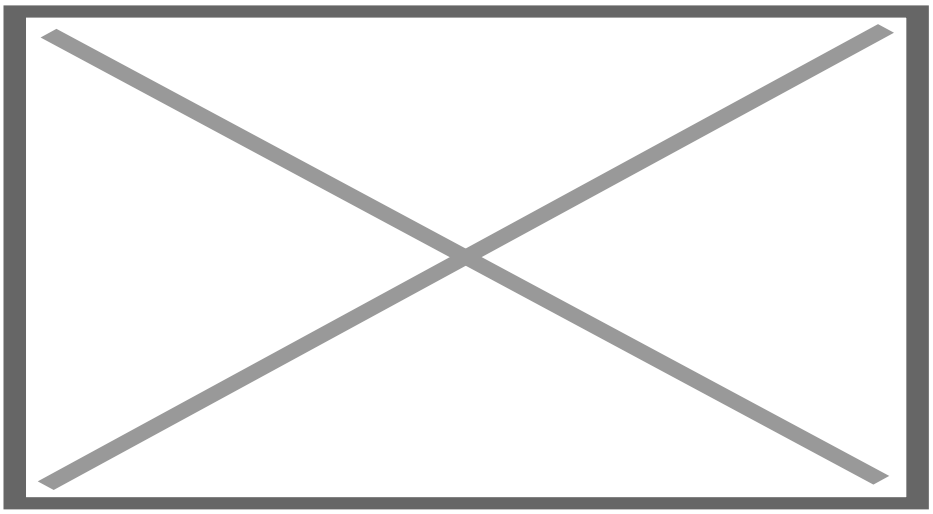
Bioceb (European Master in Biological and Chemical Engineering for a Sustainable Bioeconomy) is a 2-year joint master's program that trains future research and innovation managers to tackle the challenges related to the deployment of the bioeconomy worldwide. It addresses the needs of the growing bio-based industry sector for scientists aware of the markets and socio-economic contexts.

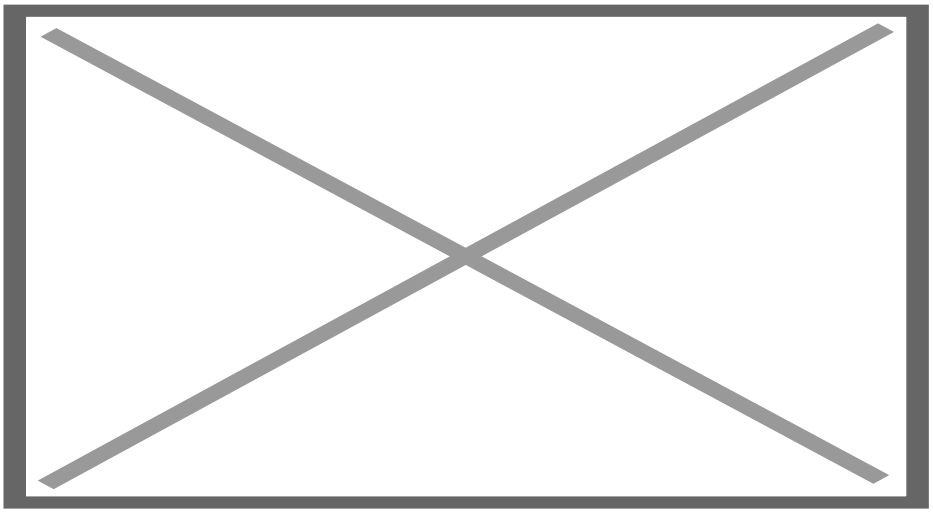
Bioceb arises from an interdisciplinary approach that combines chemistry, biology, economics, and environmental sciences, with cross-cutting skills including project management. Its modular construction promotes a cultural mix between students from different regions of the world and with various educational backgrounds. Bioceb was labelled “Erasmus Mundus Joint Master Degree” (EMJMD) by the European Commission in 2019 and renewed in 2025. The Master 1 Biomass Engineering for Bioeconomy (BEB) is part of the EMJM Bioceb, which is offered by a consortium of five European universities: Institut national des sciences et industries du vivant et de l’environnement (AgroParisTech)/Université Paris Saclay, Université de Reims Champagne-Ardenne (URCA), Université de Liège (ULiège) Belgium, Aalto University, Finland, Tallinn University of Technology (TalTech), Estonia.

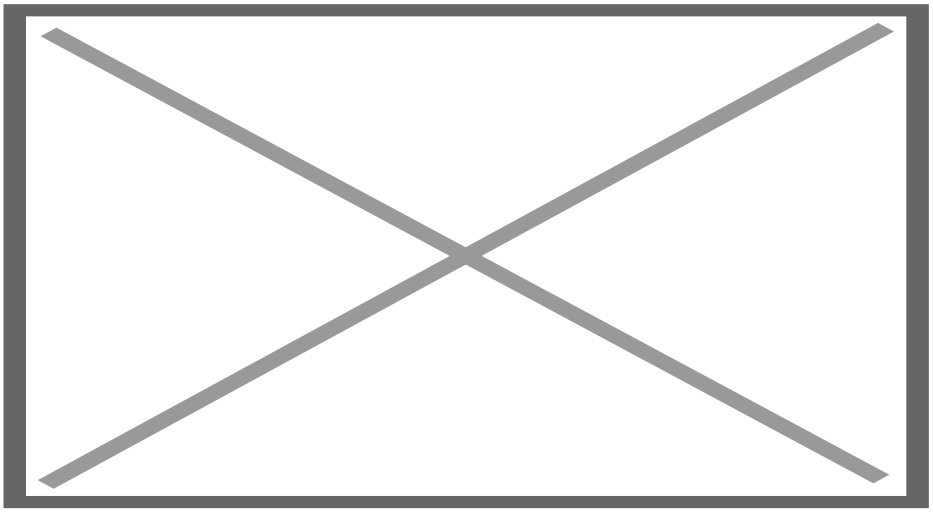
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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

Scientific and technical skills:

? Double chemistry-biology competences, including knowledge of the principles of green chemistry and associated metrics, plant science with awareness of biodiversity, and disciplinary knowledge in biochemistry, molecular biology, and microbiology;

? Skills in process and materials engineering applied to biomass production and conversion into bio-based products and energy;

? Capacity to implement integrated multi-disciplinary approaches in order to design new sustainable routes for the valorisation of agro-resources or industrial waste;

? Skills in carrying out experiments in a scientific research approach for bioeconomy-related projects

Knowledge in environmental analysis: Knowledge of sustainable and cleaner production routes, Life Cycle Analysis (LCA) and applying green chemistry metrics leading to sustainable manufacturing in line with circular economy objectives;

Competences in socio-economics sciences: Awareness of the global diversity of bioeconomy models and biorefinery systems (biomass, transformation strategies and end-products markets) and their relationships with territories; understanding of the techno-economic and legal constraints associated to the development on bio-based products and bioprocesses;

Management skills:

? Skills in project engineering with knowledge of innovation processes and of the different stages leading to industrialization from the laboratory research step (technological readiness levels);

? Soft skills: ability to discuss with people from different cultural backgrounds and take into account social and ethical expectations, to interact within a group and exploit the diversity of skills to build up and carry out a project, to communicate and disseminate scientific results, to take risks and address challenges.

Objectives

The joint first semester (S1) at URCA provides a multidisciplinary scientific knowledge base and a shared culture in the field of agro-resources and their conversion through biorefinery processes. The second semester (S2) allows the students to enrich their technical and scientific experience with cross-cutting approaches dealing with value-chain sustainability assessment, with a specific focus either on economics (AgroParisTech) or on green chemistry principles (TalTech). The third semester (S3) offers a specialization in one of the key biotechnology approaches of bioeconomy: biomass engineering (AgroParisTech), bioprocesses (ULiège) and bio-based products (Aalto). The fourth semester (S4) is dedicated to a R&D internship leading to a Master’s thesis preparation and defence. The M1 BEB only includes Bioceb students spending the second semester in AgroParisTech. The M1 Biomass Engineering for Bioeconomy is delivered by the Université Paris Saclay and operated by AgroParisTech.Bioceb aims at providing top-level and up-to-date education in chemical and biological engineering applied to the design and development of bio-based products and processes. The objective is to provide all students with a solid multidisciplinary scientific background in biology, chemistry, and biotechnology, combined with a good knowledge of bio-based products markets, and value-chain sustainability assessement. Bioceb aims at training students to systemic approaches at different scales, from the biological cell to macroeconomic systems.The programme is built-up arround three key pedagological pillars: an academic programme (lecture and practice), a green-line multidisciplinary project carried out over the 2 years, and an internship. Bioceb has the ambition to favor the graduates' insertion in the professional world through a cross-cutting approach related to innovation, entrepreneurship, and dissemination. Thanks to Bioceb modular format, each student is allowed to build-up his/her specific curriculum with a specialization in one major field of biotechnologies, among bioprocesses design and up-scaling, biomass engineering and valorization, bioproducts design and production. **In this context, the objectives of the M1 Biomass Engineering for Bioeconomy is to provide knowledge on agro-resources and biorefinery combined with skills in value chain sustainability assessment and economics.**

Débouchés

Career prospects

After a Master's or Master's + PhD: engineer (research and development, control, production, etc.) in the fields of health, pharmaceuticals, agri-food, biotechnologies, instruments and reagents, cosmetics, pollution control and the environment.

After a Master's + PhD: researcher or lecturer

Further Study Opportunities

Biology-Agrosciences
Master of Biology-Agrosciences
Students in this track can turn to research at the end of the 2nd year Master's.
In particular, this track prepares students for applied research activities, usually undertaken after a PhD, whether in academia or in R&D.

Calendar

Start of programme (indicative date)
25/08/2026
End of programme (indicative date)
30/06/2027
Admission

Admission Route

Chemistry
Life and Earth Sciences

Capacity

Available Places

16

Target Audience and Entry Requirements

The Master Bioceb is a two-year EMJMD (M1+M2). Consequently, the students applying for the M1 commit to follow the M2. This Master comprises the track "Biomass Engineering for Bioeconomy" (BEB) of the University Paris-Saclay national Master Biologie, AgroSciences. The admission requirements for Bioceb are the following:
• BSc degree or equivalent degree of at least 180 ECTS in Engineering or Science, including a strong background in at least one discipline related to Biology: Biotechnology, Biochemistry, Microbiology, Biophysics, Bioprocess engineering, Molecular biology
• Preferred but non-mandatory: a complementary background in Chemistry, Physics, or Environmental sciences

• Demonstrated English language proficiency

- B2 advanced. The candidates are selected according to the excellence of their background and academic results as well as their motivation (professional project). The M2 BEB is open to non-Bioceb students.

Période(s) de candidature

Inception Platform

From 01/01/2026 to 29/01/2026

Supporting documents

Compulsory supporting documents

Copy diplomas.

Scan of High School Diploma, undergraduate, postgraduate ...

Copy of passport.

Translation of Diploma in english

Supporting documents (TOEFL, TOEIC, certificate of a teacher ...) of a level of a foreign language.

Proof of English Proficiency

Motivation letter.

Letter of recommendation or internship evaluation.

Two reference letters

List of the last 5 years of studies mentioning only the year of study, the institution, the overall average and the mention obtained.

Official documents for the past five years if they are not covered by your last diploma

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Transcripts of record (and english translation, if needed)

Curriculum Vitae.

Additional supporting documents

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Supporting documents :
- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c
UE Sustainable and cleaner production	6	Semestre 2							
Charger le détail									
UE LCA of green technologies (including Green line project - 2nd stage)	6	Semestre 2							
Charger le détail									
UE Green chemistry metrics for feedstocks to biochemical development	6	Semestre 2							
Charger le détail									
UE Biorefinery systems: enzyme technology, chemistry processes design, kinetics	6	Semestre 2							
Charger le détail									

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	di le c
UE Biopolymers: basics, introduction and applications	6	Semestre 2							

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
UE Economic tools for environmental analysis	6	Semestre 2	39	9					

Charger le détail

UE Decision aiding, operation research and sciences for innovation	3	Semestre 2	16	8					

Charger le détail

Biomass resources and territories	6	Semestre 2	12	12	18				

Charger le détail

UE Green line project - 2nd stage	6	Semestre 2	9	21	60				

Charger le détail

UE Environmental assessment for a sustainable bioeconomy	4	Semestre 2	9	3					

Charger le détail

UE Bioenergies and lignocelluloses	2	Semestre 2	9						

Charger le détail

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	c
Transversal and intercultural skills Charger le détail	3	Semestre 2							

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	c
UE Strengthening in chemistry or in biology (according to student background) + process engineering Charger le détail	3	Semestre 1	25	10					
UE Molecular biology of microorganism Charger le détail	3	Semestre 1	10	5	10				
UE Green Line project - 1st stage Charger le détail	3	Semestre 1	9	15					
UE Green chemistry - biosourced buildings blocks Charger le détail	3	Semestre 1	12	4	6				
UE Biochemistry of plant components and biorefinery Charger le détail	6	Semestre 1	25	8	17				

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	c
UE Agricultural and viticultural soils Charger le détail	3	Semestre 1	20		5				
UE Plant-soil interactions Charger le détail	3	Semestre 1	15	4	6				
UE Physiology and genetic of plant development Charger le détail	6	Semestre 1	28	12	10				

Teaching Location(s)

REIMS
PALAISEAU

Contact

- **Stephanie BAUMBERGER**
- **Sophie LANDAUD-LIAUTAUD**

http://www.universite-paris-saclay.fr/formation/master/biologie-agrosciences/m1-biomass-engineering-bioeconomy