Université Paris-Saclay

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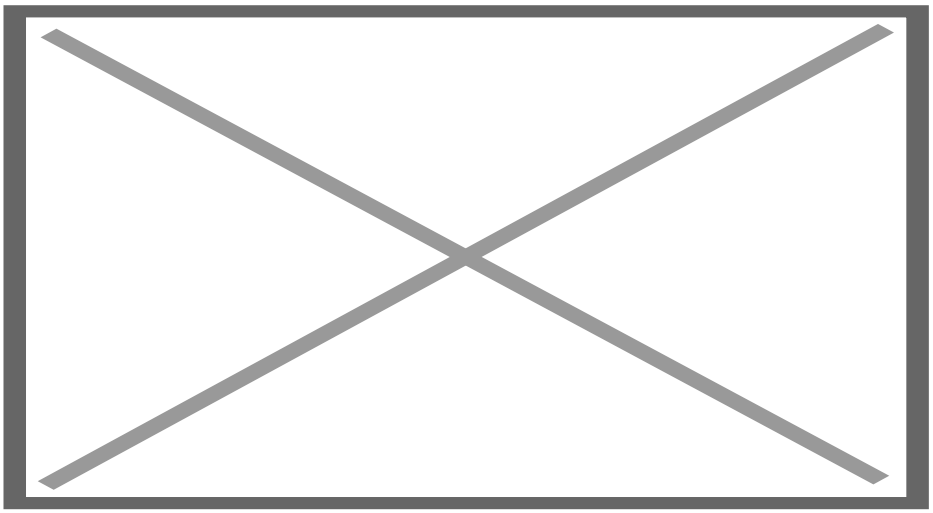
M2 Microbiology and Biological Bioengineering

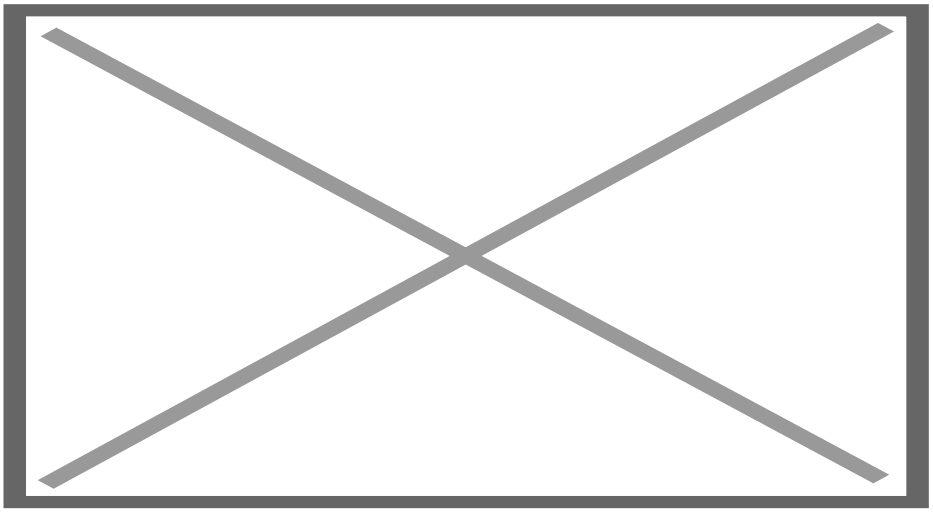
Master's degree
Specialisations Nutrition and Food Science | Microbiologie
Language(s) of instruction
English
French

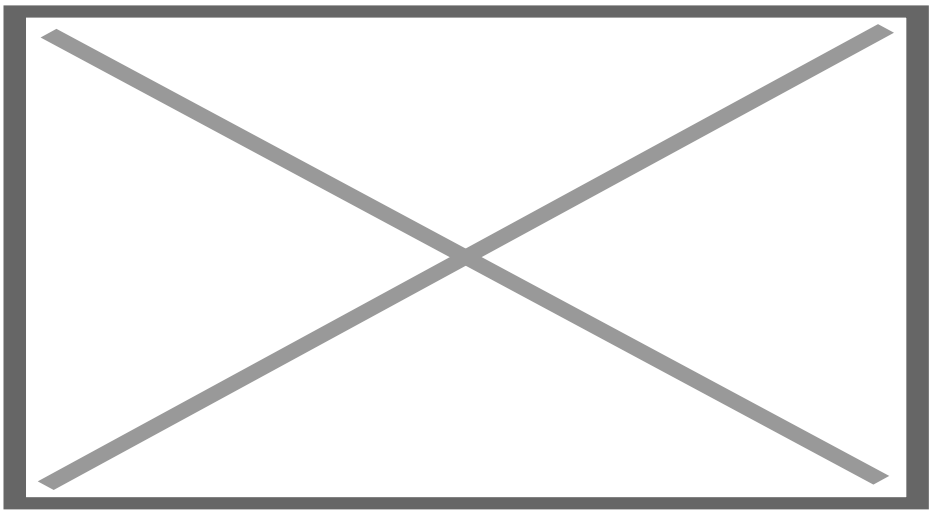
The M2 Microbiology and Biological Engineering program offers advanced training in microbiology and biotechnologies, combining fundamental and applied scientific skills. It addresses current challenges in the healthcare, agri-food, cosmetics, pharmaceutical, and environment sectors. By integrating research, industrial innovation, management and quality, it prepares students for careers in research and development, quality assurance, or support functions within public or private organizations.

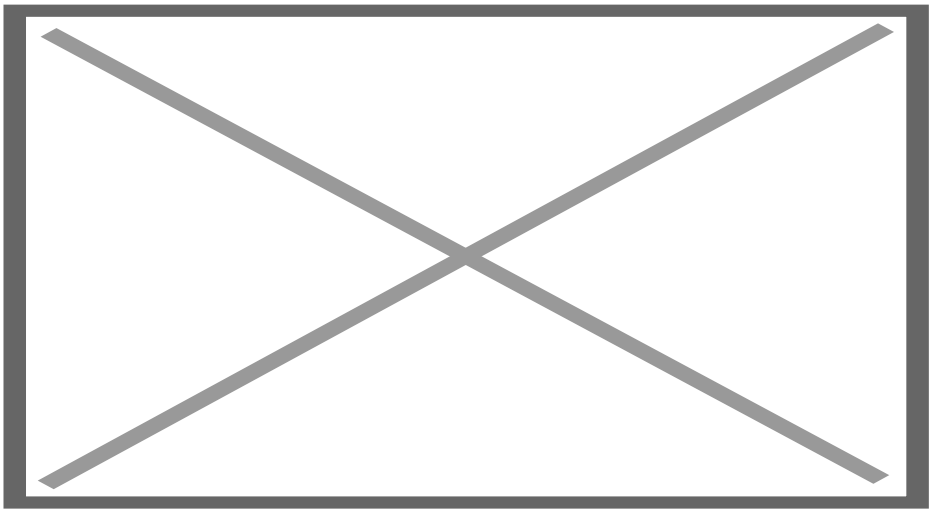
The M2 MGB is offered as an initial or continuing program, in various formats. These flexible optins allow students to complete either a 6-month intership or a 12-month work-study program, both providing valuable professional experience in a company or public research laboratory. It is organized around to 2 tracks: Microbial Science in Environment and Health (SMES) and Microbial Science in Food and Health (SMAS). The program includes a commin core of 220 h (15 ECTS) which includes strategic and methodological approaches through lectures, 3 weeks of hand-on practical training, an innovative microbiology project, and the acquisition of qualité standard in experimental sciences. This is complemented by 6 ECTS of required courses and 2 to 3 elective courses (9 ECTS) depending on the chosen track.

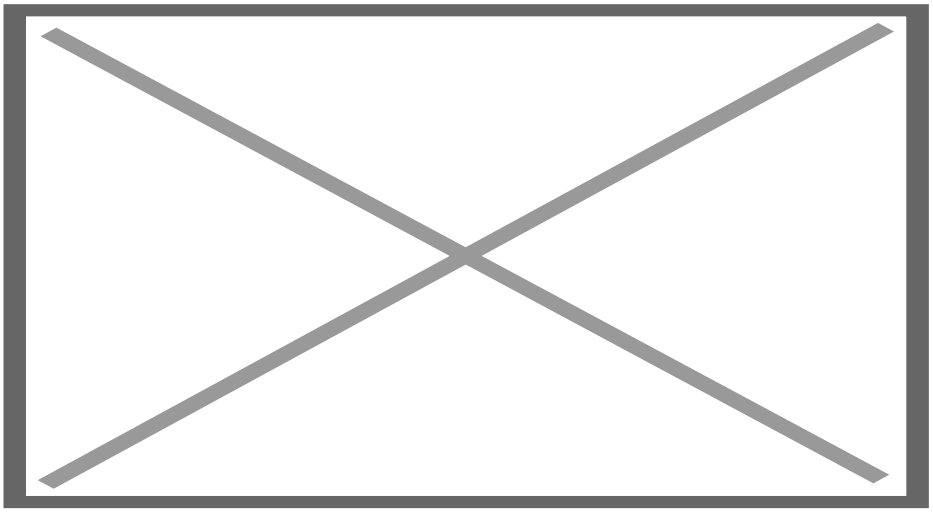
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Information

- Overview
- Application requirements
- Schedule

Présentation

Skills

- **Microbiology expertise and cross-disciplinary scientific knowledge:** Formalize and construct scientific and technical reasoning in microbiology. Mobilize resources from a wide range of relevant biological sciences (molecular biology, microbial genetics and physiology, genomics, biochemistry, immunology, biotechnology, bioengineering). Have an overview of the potential for studying and exploiting microbial biodiversity. Practice the tools of biotechnology at the molecular and cellular levels, from the laboratory to the industrial scale. Master methods for exploring the functionalities of microorganisms for the production of food, high value-added biomolecules, new therapeutic targets, materials, and energy. Master the principles and methods of microbiological diagnosis. Practice process hygiene. Master quality management tools and methods in an industrial and scientific production context.
- **Understanding and analyzing issues in microbiology and biological engineering:** Critically evaluating relevant information to formulate and analyze a problem based on a scientific question or technical or regulatory documentation. Research, process, and update the documentation collected. Combine the industrial, regulatory, and financial challenges of an industry or administration within its socio-technical-economic environment. List the technical, economic, and safety factors involved in choosing industrial and laboratory equipment or processes. Know how to assess the nature of microbial risk. Keep up with technical, methodological, and regulatory developments.
- **Autonomy in terms of producing results and developing methodological applications:** Experimental autonomy: Carry out an experimental microbiology project using a scientific approach. Monitor a tool as part of a quality approach (e.g., HACCP). Organizational and decision-making autonomy: Design an experimental approach and lead a biotechnology research and/or development project in line with the economic and regulatory context. Organize and carry out strategic innovation projects in the context of bioproduct/bioprocess development or method validation. Implement and

monitor quality controls in accordance with current procedures and regulations. Design a hygiene and cleaning plan. Improve actions as part of a quality approach.
- **Critical thinking and ability to analyze results:** Generate and analyze complex data sets. Statistical analysis of data sets. Critically analyze methodological approaches and results. Practice a process of scientific, technical, and technological monitoring. Propose solutions and perspectives.
- **Project management skills**: Design and organize work. Implement managerial skills: prepare, plan, and manage a project. Create project schedules and associated budgets. Be able to prepare, lead, and conclude a work meeting. Convince and defend a project in a French-speaking or international (English-speaking) context. Develop self-awareness and interpersonal skills in a professional context (interpersonal skills). Work as part of a team within a company or academic institution.
- **Synthesis and communication skills:** Practice scientific and technical communication tailored to the target audience, in French and English. Produce scientific, technical, or regulatory summary documents. Communicate work orally and in writing. Produce educational materials in various formats. Master office automation tools.

Objectives

The Master's degree in Microbiology and Biological Engineering (MGB) provides advanced disciplinary training in microbiology, biological engineering, and microbial biotechnology. It aims to equip students with specific expertise in strategies, approaches, and methods - either validated or under development - allowing them to : explore, study, generate, and exploit microbial biodiversity; master microbial diagnostics and detec microbial risks; prevent heath incidents, ensure hygiene, and implement quality management.

The MGB master's program prepares students both for research and for careers where microbiology skills are fundamental and transferable, across a wide range of sectors: Health, Food sciences, Environment, and Industrial biotechnologies. Its objectives are twofold: 1) to train professionals in microbiology and biotechnologies, capable of working in bioindustries and service companies; 2) to prepare students for careers in research and development within biotechnology companies or public laboratories, with the opportunity to pursue doctoral studies.

The program is jointly offered by several universities and leading life sciences institutions of Paris-Saclay University (Faculty of Sciences of Orsay and AgroParisTech), in partnership with Paris-Cité University. The second year of the program is available within three specializations: Microbiology (Paris-Saclay University); Nutrition and Food Sciences (AgroParisTech) ; and Molecular and cellular biology (Paris-Cité University).

In the second year, The MGB Master's can also be completed through a work-study program, via an apprenticeship contract with the CFA of UP Saclay. The training brings together professionals from industry and academics - teachers, researchers, and expertis in microbiology and biotechnology - benefiting fromover 35 years of experience and supported by the active participation of its alumini network. This network contributes to the renewal and diversity of contributions.

The program also relies on site visits, professional trade fairs, internships, and work-study contracts, ensuring continuous alignment with evolving industrial and scientific needs.

The MGB curriculum integrated tree major disciplinary areas:

1. Microbiology, from molecular foundations to the cellular level and its interactions wtih the environment, covering disciplines such as biochemistry and immunology, molecular biology, microbiology physiology and metabolism, microbial genetics, genomics and metagenomics;

2. Health and safety management, through the study of biological contamination, hazard identification and risk assessment, strategies to combat pathogens, development and qualification of diagnostic and monitoring, tools, and mastery of best hygiene pratices;

3. Innovation project management, marketing, and communication, by understanding how compagnies operate and position themselves in their socio-technical and economic environment, studying the fundamentals of operational and strategic marketing, and learning managerial skills required to lead innovative projects.

The training includes a common theoretical and practical core (9 ECTS) , provinding an overview of microbial biodiversity and modern tools for the exploration, exploitation, and control of microorganisms in industry. Three weeks of practical courses illustrate these teachning through: th study of model microorganisms; bioproduction and biotransformation; & the application of diagnostic and safety methods.

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 or Master's + PhD: engineer (Research & Development, control, production, etc.)
Design engineer in the research / scientific sector
Research or Design Engineer
Development Engineer
Health-environment engineer
Drinking water sanitary risk control engineer

Further Study Opportunities

PhD
Specialised Master's
Clinical Research associate or assistant course

Calendar

Start of programme (indicative date)
04/09/2026
End of programme (indicative date)
17/09/2027
Admission

Admission Route

Life Sciences
Health sciences
Science and Technology
Engineering Sciences

Capacity

Available Places

24

Target Audience and Entry Requirements

Students who have completed the first year of a Master's course in icrobiology, Health Biology or Cellular and Molecular Biology, or a first year of a Master's course / equivalent engineering course in Biology and Biotechnologies. Knowledge-base required in microbiology and virology (biodiversity, genetics, physiology), genomics, biochemistry, molecular and cellular biology. Knowledge in Biotechnology a plus.

Période(s) de candidature

Inception Platform

From 25/04/2026 to 07/06/2026

Supporting documents

Compulsory supporting documents

Copy diplomas.

Motivation letter.

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

Certificate of French (compulsory for non-French speakers).

Curriculum Vitae.

Detailed description and hourly volume of courses taken since the beginning of the university program.

Selection sheet completed.

Document indicating the list of local M2 choices available here : https://urlz.fr/i3Lo.

Additional supporting documents

Letter of recommendation from a trainee.

Letter of recommendation or internship evaluation.

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	d l
Bloc 1 - SMAS - Tronc commun aux filières stage et apprentissage	0	4	22,5	7,5					
Bloc 2 - SMAS - UEs spécifiques aux filières stage et apprentissage	0	2	22,5	7,5					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed	Lecture/practical	directed study/practical class	d l
Bloc 3 - Stage ou apprentissage sur site professionnel	0	2	22,5	7,5					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed	Lecture/practical	directed study/practical class	d l

Bloc 1 - SMES - Tronc commun aux filières stage et apprentissage	0	4	22,5	7,5					
Bloc 2 - SMES - UEs spécifiques aux filières stage et apprentissage	0	2	22,5	7,5					
Bloc 3 - Stage ou apprentissage sur site professionnel	0	2	22,5	7,5					

Teaching Location(s)

ORSAY
PARIS 13
PALAISEAU
VERSAILLES

Academic Partner(s)

Université Paris-Cité, UVSQ, AgroParistech

Contact

- **Severine Layec**

  MCF
-

Cécile LABARRE

MCF

http://www.universite-paris-saclay.fr/formation/master/nutrition-et-sciences-des-aliments/m2-microbiologie-et-genie-biologique