

Master Ingénierie de la santé – Parcours : Biothérapies moléculaires et cellulaires / Molecular and Cellular Biotherapies (MCB)

SCIENCES, TECHNOLOGIES, SANTÉ

Présentation

The Health Engineering Master's program (BME Paris) is designed to provide a two-year education in the field of bioengineering, at the intersection of biomedical sciences and engineering sciences. It results from a partnership between **Université Paris Cité** and **Arts et Métiers**.

The Master's program is based on a distinctive partnership that fosters an interdisciplinary approach, encourages student initiatives and promotes a global perspective. This policy is supported by the top-level and complementary expertise and know-how of the two partners: engineering science in the engineering school within Arts et Métiers, on the one hand, and biomedical and health science at Université Paris Cité, on the other.

The teaching staff are primarily drawn from the partner institutions. Guest lecturers include hospital clinicians from APHP and researchers from other schools and academic institutions as well as from private companies (e.g. GE Healthcare, Philips Healthcare, Renault, Sanofi, Thalès, Materialise Medical, etc.).

Learning outcomes

The BME Paris Master offers an exemplary program of excellence designed for students from diverse backgrounds, including biology, chemistry, physics, mathematics, engineering, medicine, pharmacy, health sciences and computer sciences. The primary objectives of the Master's program are:

- to provide students with the knowledge and tools required in a wide range of the biomedical engineering fields
- to foster a fruitful collaborative spirit between engineering and medical students, with the ultimate goal of bridging the existing « culture gap » between the corresponding professions.

While the second year (M2) offers five specialization tracks, the first year (M1) is devoted to strengthening and broadening students' skills in specific engineering and biomedical subjects. Students receive guidance on their selection of teaching units, ensuring they are current with essential science subjects that might not have been covered in their prior studies. For example, engineering students may focus on physiology and anatomy, whereas biology or medical students may focus into signal processing and mechanics.

In M1 (semesters 1 and 2), there is one single track, with individualized choices of courses according to students' backgrounds and their choice of specialization for M2.

Master 1

The M2 (semesters 3 and 4) offers five tracks:

- **NeuroTechnologies (NeuroTech)**
- **BioImaging (BIM)**
- **Innovation in Digital Health (eHealth)**
- **BioMechanics (BioMECH)**
- **Molecular and cellular biotherapies (MCB)**

OBJECTIFS

The track on **Biotherapies and Advanced Therapy Medicinal Products (ATMPs)** offers an exciting opportunity

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to dive deep into some of the most revolutionary fields in modern medicine. The program is designed to provide students with a comprehensive **knowledge** of the rapidly evolving areas of **cell- and gene-based therapies, tissue engineering and regenerative medicine**. Through a blend of lectures, hands-on laboratory work, and case studies, the program is structured to address key aspects of biotherapy development, including molecular and cellular/stem cell biology, immunology, and bioengineering techniques, providing participants with a solid grasp of the science behind advanced therapies.

Additionally, the program explores the **regulatory frameworks and the clinical applications** essential for the development and safe administration of these innovative therapies, preparing them for research and career opportunities in academia as well as in biopharmaceutical and biotechnology firms, specialized in these fast-growing therapies.

The MCB track thus serves as a comprehensive pathway into the expanding fields of cell and gene therapy, biopharmaceuticals, and regenerative medicine **positioning students at the forefront of groundbreaking therapeutic innovations**.

Le détail du programme de M1 et de M2 est accessible ici : <https://www.bme-paris.com/program/master-2/molecular-cellular-biotherapies-mcb/>

This curriculum is part of Université Paris Cité's Graduate School of BioMedical Engineering.

COMPÉTENCES VISÉES

- Respect scientific ethics
- Design and develop scientific projects
- Implement a project, define the objectives and context, carry out and evaluate the action
- Conduct and develop scientific and technical projects
- Analyze, diagnose and interpret the results of scientific experiments

- Know how to assess professional risks, implement specific evaluation methods

- Master specific methods and tools

Cross-curricular skills

- Work independently, manage time, self-evaluate.
- Use information and communication technologies.
- Conduct information research, identify access modes, analyze relevance, explain and transmit.
- Write clearly, prepare appropriate communication materials.
- Scientific communication in English.
- Working as a team: integrating, positioning, collaborating.
- Integrate into a professional environment: identify your skills and communicate them.

Programme

ORGANISATION

La formation se déroule en anglais, à temps plein.

Un stages de 2 à 4 mois obligatoires en Master 1 et un stage de 5 mois obligatoire en Master 2 dans un laboratoire de recherche académique, hospitalier ou industriel.

STAGE

Stage : Obligatoire

Durée du stage : 2 à 4 mois en M1, 5 mois en M2

Stages et projets tutorés :

OUI

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Admission

Etudiants français et étrangers titulaires d'une licence ou d'un Master scientifique, étudiants en médecine ou en pharmacie, élève ingénieurs.

PRÉ-REQUIS

C1 level in English (TOEIC, TOEFL, ...).

Droits de scolarité :

Les droits d'inscription nationaux sont annuels et fixés par le ministère de l'Enseignement supérieur de la Recherche. S'y ajoutent les contributions obligatoires et facultatives selon la situation individuelle de l'étudiant.

Des frais de formation supplémentaires peuvent s'appliquer au public de formation professionnelle. Plus d'informations [ici](#).

Date de début de la formation : 1 sept. 2025

Et après ?

POURSUITE D'ÉTUDES

Opportunities

- PhD in a field related to the M2 track followed by the student, in academia or jointly with a company (CIFRE PhDs).
- R&D positions in large companies or startups, in almost all activity biomedical and biotech sectors.
- Continuing medical or pharmacy school, or accessing it (« passerelle »), in either 2nd or 3rd year.

Business programs in biotech management (ESCP, EM Lyon / Centrale Supélec...)

PASSERELLE

Passerelle vers médecine, pharmacie ou odontologie

Contacts

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En bref

Composante(s)

UFR des Sciences fondamentales et biomédicales

Etablissements co-accrédités

- Ecole Nationale Supérieure d'Arts et Métiers (ENSAM)
- Université PSL

Niveau d'études visé

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BAC +5 (niveau 7)

ECTS

120

Modalité(s) de formation

- Formation initiale
- Formation professionnelle

Validation des Acquis de l'Expérience

Oui

Langue(s) des enseignements

- Anglais

Capacité d'accueil

56 en M124 en M2 MCB

Lieu de formation

Campus Saint Germain des Prés, Site Observatoire

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