

Master Ingénierie de la santé – Parcours : Biomécanique / BioMechanics (BioMECH)

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)**

Biomechanics (BioMECH) is one of the 5 M2 proposed tracks.

OBJECTIFS

BioMechanics is one of the 5 M2 proposed tracks.

The BioMECHANICS (BioMECH) track offers in-depth expertise and essential tools to understand and tackle

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biomedical challenges using principles of mechanics. This program integrates recent and upcoming advancements in biomechanics, designed to offer innovative solutions to pressing health issues and respond to industry needs. Through a combination of lectures, team projects, case studies, and invited talks by both academic and industry experts, students gain knowledge in a stimulating, multidisciplinary environment. The BioMECH program emphasizes translational learning, guiding students from foundational science and modeling to clinical application, in close collaboration with clinicians.

BioMECH equips engineers and healthcare professionals with the skills to engage in research and development (R&D) in biomechanics. Students learn to: Address specific biomedical challenges, Conduct innovative, ethical, and rigorous research, Collaborate across fields at the intersection of mechanics, materials, and biomedicine.

Program Structure

A core curriculum provides a comprehensive overview of biomechanics fundamentals and methods. Additionally, students choose one of two specialized tracks: **Engineering Science (EngSci)** or **Health Science (HealthSci)**.

The HealthSci track offers a part-time, flexible program for clinicians, which can be completed over one or two years. Courses are held in person at ENSAM every Thursday from 9:00 AM to 5:30 PM, beginning in early November. The format is compatible with part-time professional activities, provided students attend classes on Thursdays and allocate sufficient time for experimental research.

Program Overview for Both Tracks

The first semester starts with an **integration week** composed of:

- A general kickoff meeting that gives a condensed overview of the Master program.
- An individual meeting with one member of the BioMECH pedagogic team.

- 3 orientation days (team building, student organization, outdoor walking rally, Skills workshop, Pitch workshop, Mock interviews)

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

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ORGANISATION

La formation se déroule en anglais et à temps plein pour le parcours de M2 BioMECH Engineering Sciences.

Le parcours BioMECH HealthSci est un programme flexible à temps partiel pour les cliniciens, qui peut être complété sur une ou deux années. Les cours sont dispensés en présentiel à l'ENSAM tous les jeudis de 9h00 à 17h30, à partir de début novembre. Le format est compatible avec les activités professionnelles à temps partiel, à condition que les étudiants assistent aux cours le jeudi et consacrent suffisamment de temps à la recherche expérimentale.

Further details of the programme can be found on the BME Paris master's website: <https://www.bme-paris.com/program/master-2/biomechanics/>

STAGE

Stage : Obligatoire

Durée du stage : 2 x 2 mois en M1, 5 mois en M2

Stages et projets tutorés :
OUI

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

Pour en savoir plus, rendez-vous sur > u-paris.fr/choisir-sa-formation

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Niveau d'études visé

BAC +5 (niveau 7)

ECTS

120

Modalité(s) de formation

- Formation initiale
- Formation continue

Validation des Acquis de l'Expérience

Oui

Langue(s) des enseignements

- Anglais

Capacité d'accueil

24

Lieu de formation

Campus Saint Germain des Prés

En bref

Composante(s)

UFR des Sciences fondamentales et biomédicales

Etablissements co-accrédités

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

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