

Master Ingénierie de la santé – Parcours : Biomaterials (BioMAT)

SCIENCES, TECHNOLOGIES, SANTÉ

Présentation

The BME-Paris Master is designed to provide a 2-year education program in the field of bioengineering, at the cross-road of biomedical and engineering sciences. It results from a partnership between Université Paris Descartes, Arts-et-Métiers ParisTech and Université PSL.

Based on this unique partnership, this Master is founded on an educational policy that favors interdisciplinarity and students' initiative as well as international perspective. This policy is supported by the top-level and complementary expertise and know-how of the three partners: engineering sciences in the three engineering schools within PSL (ESPCI Paris, Mines ParisTech and Chimie ParisTech) and Arts-et-Métiers ParisTech, on the one hand, and biomedical and health sciences at Université Paris Descartes, on the other.

Teaching faculty is mostly from the partner institutions. Guest lecturers include hospital clinicians (AP-HP), and researchers from other schools and universities as well as from private companies (e.g. GE Healthcare, Philips Healthcare, Renault, Sanofi, Thalès, Materialise Medical, ...).

Learning outcomes

The BME-Paris Master proposes a program of excellence intended for students with a wide variety of backgrounds (biology, chemistry, physics, mathematics, engineering as well as medicine, pharmacy and other health sciences...).

The overarching goals of the Master 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, that will eventually bridge 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 are advised in their individual choices of teaching units, to bring them up to date on the fundamental science subjects they may not have acquired through their previous studies (eg physiology and anatomy for engineering students, or signal processing and mechanics for biology or medical students).

Biomaterials and Biodevices (BioMAT) is one of the 5 M2 proposed tracks.

This university program is part of Université Paris Cité's Graduate Schools of Innovative Materials and Musculo-Skeletal Sciences, connecting master's and doctoral courses with cutting-edge research labs.

- * The Graduate School of **Innovative Materials** offers students the chance to explore creating materials to address new socio-economic challenges. [Read more >](#)
- * The Graduate School of **Musculo-Skeletal Sciences** focuses on using advanced methods to study diseases affecting mineralized tissues, joints, muscles, and tendons. [Read more >](#)

OBJECTIFS

the field of prosthetics design. Remarkable opportunities for the biomedical field have emerged from the recent progress in the understanding, characterization, and manipulation of biological materials. Design, control, and modelling

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

of biological, bio-sourced, biocompatible, and biomimetic materials are central to numerous biomedical innovations ranging from therapeutic approaches in the field of regenerative medicine to industrial processes.

The BioMAT track provides scientists, engineers, and medical students with the wherewithal to face the numerous challenges of biomaterials R&D; how to apply their skills in order to solve specific biomedical problems, how to carry out innovative and fruitful research with the appropriate methods and ethical considerations, how to collaborate and interact in projects at the interface among materials, biomedical science, and medicine. It is accessible to engineering and life-science students (materials science, physics, chemistry, medicine, pharmacy, dentistry, and biology) preparing for career paths in academic research or industrial R&D environments.

The program provides students in-depth knowledge of the understanding and use of biomaterials, from nanoscale biomolecules, such as proteins, lipids, and synthetic polymers to macroscale prostheses, orthosis, and implants. This education relies on a rich combination of high-level lectures, conferences and exchanges with invited experts and interdisciplinary group projects. From all these experiences, the students will learn how to apply their skills on health-related applications ranging from implant and tissue engineering through the modelling and characterization of biological materials to material design for therapeutics.

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.

Deux stages de 2 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 x 2 mois en M1, 5 mois en M2

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

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](#).

Et après ?

POURSUITES 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

TAUX DE RÉUSSITE

91 %

Taux de réussite sur l'année de diplomation 2020-2021 (nombre d'admis par rapport au nombre d'inscrits administratifs)

Contacts

Responsable du diplôme

François Rannou
francois.rannou@aphp.fr

Responsable du diplôme

Laurent Corte
laurent.corte@mines-paristech.fr

Responsable du diplôme

Rachele Allena
rachele.allena@ensam.eu

Contact administratif

Barbara Dallez
+33 (0)1 76 53 46 90
barbara.dallez@u-paris.fr

Contact administratif

Isabelle Guenerie
+33 (0)1 76 53 46 64
isabelle.guenerie@u-paris.fr

En bref

Composante(s)

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

UFR des Sciences fondamentales et biomédicales

Etablissements co-accrédités

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

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

Lieu de formation

Campus Saint Germain des Prés

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