

PhD Program in Biotechnology

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General aim of the PhD course in Biotechnologies is to provide a thorough background in biotechnological research, for purposes ranging from basic research to technology transfer.

The programme comprises three curricula, namely "Medical Biotechnology", "Molecular and Industrial Biotechnology", and "Biomaterials and Biodevices"

Medical Biotechnology is mainly focused on molecular and clinical diagnostics and development of innovative and customized therapies. The topics of the PhD program span from the development of pharmacological tools to defeat a variety of diseases to the genetic processes that lead to organ regeneration. Active areas of research include molecular cell mechanisms in cancer, pharmacology of biotech drugs, cell biology (including stem cell biology) and development of new medical devices. The educational objective of the program encompasses collaborative exchanges with national and international partners and internal classes on biotechnology disciplines.

"Molecular and Industrial Biotechnology" focuses on active research areas, such as: advanced genetic and microbial biotechnologies, cellular technologies for the manipulation of stem cells, gene expression and cloning in prokaryotic and eukaryotic cells, biotechnological large scale production of useful bio-molecules, bio-based products, and recombinant cells; genetic, genomic, proteomic and cellular function analyses through technological approaches *in silico*, *ex-vivo* and *in vivo*; molecular and cellular technologies for biomedical application and for drug discovery, biotechnological strategies for industrial processes linked to chemistry, green-chemistry, biochemistry, supervision and quality control of biotechnological systems.

"Biomaterials and Biodevices" is primarily aimed at the design and development of smart biomaterials that, together with the synthesis of nanostructured sensors, are opening new frontiers in the field of biotechnology. Indeed, biomaterials and bio-devices represent an emerging research area that is applicable in all fields of biotechnology (red, green and white), playing a significant role in food and nutrition sciences, biomedicine, agriculture, imaging and many other technological fields.

Educational objectives, integrated with the teaching and research activity, are:

- Improvement of theoretical and experimental knowledge by lectures and laboratory work, under mentorship (first year).
- Development of the research project, attendance at conferences, participation in educational and training activities (second year).
- Research activity, continuous training, and writing of thesis (third year).

Each year, students are expected to participate actively in the Winter School on Biotechnology held by members of the Department, internationally renowned researchers, and industrial researchers and managers.