Dottorato in Biotecnologie
Università degli Studi di Perugia

Information Sheet on the PhD course in Biotechnology

Updated to Jun 1st 2020

A. **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"

B. **Articulation in curricula**

1. **Medical Biotechnology** is mainly focused on molecular and clinical diagnostics and development of innovative and customized therapies. The topics of the PhD program spans 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), development of new medical devices. The educational objectives of the program encompass collaborative exchanges with national and international partners and internal classes on biotechnology disciplines.

2. **Molecular and Industrial Biotechnology** focuses on active research areas such as: advanced genetic and microbial biotechnologies, cellular technologies for 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.

3. **Biomaterials and Biodevices** is primarily concerned with the design and development of smart biomaterials that, together with the synthesis of nanostructured sensors, is opening new frontiers to biotechnology. Indeed, biomaterials and bio-devices represent an emerging research area 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.

C. **Educational Objectives** The objectives integrated with the three-year teaching and research activities for the thesis, on site or abroad, are:

1st year: learning of theoretical and experimental knowledge with lessons and laboratory activities, under tutoring.
2nd year: development of the research project, participation in conferences, participation in teaching and training activities.
3rd year: research and continuous updating, drafting of the experimental thesis.

D. **Courses** Students are required to mature 50 credit forming units (cfu) during the three-year period, drawing on the courses made available to the doctorate. In addition, each year students actively participate in the Winter School on Biotechnology, held exclusively in English, with

internationally renowned researchers, members of the PhD faculty, researchers and industrial managers. For detailed information, please refer to the specific program sheets in the web site.

E. Competences

E1. Linguistics

The Doctoral Course offers doctoral students the opportunity to participate to foreign language courses held at the University Language Canter (CLA). The levels of language courses offered at the CLA refer to the Common European Framework of Reference (CEFR). The language courses may have a six-month (10 ECTS) or an annual (13 ECTS) duration. At the end of the course the level achieved in the individual language skills will be assessed.

E2. Information technology

The Doctoral Course offers doctoral students the opportunity to participate in computer and labs already offered in other University study courses. Specific courses will also be organized in modules of 1 CFU (for example the use of software for data analysis, word processing programs, archiving and import programs for bibliographic data; in-depth study on databases and their consultation). For these courses, a verification of the level of knowledge acquired will be provided.

E3. Management of research, knowledge of research systems and funding systems.

The Doctoral Course offers the opportunity to participate to 1 CFU courses on research management, knowledge of research systems and funding systems. The courses will deal with: research design and development techniques; drafting and management of financial plans for research projects; project management by stages of work progress and their reporting; management of relations with lenders. The courses include a final check.

E4. Enhancement of research results and intellectual property

The PhD course offers the opportunity to participate to six 1-CFU courses on the enhancement of research and intellectual property. The 6 courses will cover: the transition from basic to applied research; research enhancement techniques; the funding of applied research; the protection of intellectual property; the intervention of universities in favour of patents; business creation and research spin-offs. The courses include a final verification.

F. Job and career opportunities

The aim of the doctorate is to develop skills and deep understanding in the experimental design, analyses and data management in order to achieve autonomy research and project management. This will allow:

1. Allocation in the field of research (universities and other public and private research institutes);

2. Allocation in biotechnological industries, in public and private companies / entities operating in the service sector and specifically:

research and development laboratories and production and quality control departments in biotechnological companies and other companies interested in biotechnological innovation such as chemical companies (fine chemicals, bioenergetics, innovative materials), pharmaceuticals, agri-foodstuffs,

3. Allocation within the NHS.

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G. Agreements and cooperation with third parties

G1. Foreign universities affiliated

1. THE HEBREW UNIVERSITY OF JERUSALEM - Israel
2. NICOLAUS COPERNICUS UNIVERSITY OF TORUN - Poland

G2. Other associated / affiliated Bodies / Companies

1. ANGELANTONI LIFE SCIENCE
2. COSTA D'ORO S.P.A.

G3. Other bodies / companies with collaborations

1. Brunner Tomas Universität - Konstanz, Germany
2. Saarland University, Germany
3. Libert Claude Universiteit Gent, Belgium
4. Katholieke Universiteit Leuven, Belgium
5. Jurga Stefan - Nanobiomed Center- Poland
6. Ospedale Casa Sollievo della Sofferenza - Italy