



UNIVERSITÀ
DI FOGGIA



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SHEET B

DOCTORAL COURSE IN BIOTECHNOLOGY AND SMART PRACTICES FOR A SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES, FOOD AND AGRICULTURE

Course: XXXVIII

Estimated starting date of the course: 1/11/2022

Coordinator: Professor Maria Luisa Amodio (PO) – Area 7 SSD AGR/09 – University of Foggia

Administrative headquarters: DEPARTMENT OF AGRICULTURAL SCIENCE, FOOD, NATURAL RESOURCES AND ENGINEERING – UNIVERSITY OF FOGGIA

Length: 3 years

Curricula: YES

1. Sustainable agriculture, management of natural resources and biodiversity.

Throughout this curriculum, skills for the sustainable management of natural resources and agriculture will be developed, with particular regard to precision agriculture and smart farming, decision support systems, reduction of inputs in agriculture, logistics and management of inputs and production outputs (Internet of things), quality of production, environmental protection, animal, plant and microbial biodiversity, bio-industry for the exploitation of waste and non-food products to end the cycle, biorefinery, biogenetics.

2. Innovative technologies for the quality and safety of food.

Skills for the precise management of processes, logistics and management of processing inputs and outputs (Internet of things) will be developed as well as quality, traceability and safety of food products, biotechnologies and innovative technologies with low environmental impact, in order to increase the added value of the products maximizing efficiency and reducing waste; assessment of the sustainability of products and processes, strategies to increase the consumers and actors' awareness in the supply chain on environmental issues; marketing of food products obtained in a sustainable way.

Total number of positions available No. **18** of which:

- No. 5 positions through scholarships granted by the university;
- No. 2 positions through scholarships granted by Ministerial Decree No. 351/2022:
 - Within the scope of: PNRR;
- No. 11 positions through scholarships granted by Ministerial Decree No. 352/2022:

Short description of the training project:

This doctoral course aims to train highly qualified professionals capable of designing, conducting and promoting research activities in the field of biotechnologies, intelligent and sustainable technologies for the management of natural resources, agri-food systems and more generally the environment. This goal will be achieved through training in basic and applied research, providing interdisciplinary, multidisciplinary and transversal scientific skills which, by combining the principles of the circular economy, digital transition, and green technologies can favour the process of vertical and horizontal integration between supply chains. Indeed, the training course integrates the skills of biotechnology, and on the other hand, engineering and logistics applied to agricultural and food systems. Upon completion of the doctoral program, in fact, the dual purpose of introducing highly qualified personnel into the world of work and, at the same time increasing knowledge in specific research areas would be pursued, through participation in projects at national and international level. The course, although not connoted as an industrial doctorate, provides for the involvement of production and processing companies present on the regional and national territory in specific research projects, thanks to the direct co-financing of the same activities by the companies and thanks to the participation in regional selections, national and international research as documented by the intense research and development activity, and third mission carried out by the department. On the one hand, this will favour the technology transfer and therefore the innovation of these companies, and on the other hand it will facilitate the

recruitment of PhDs by companies. In particular, upon completion of the course, these researchers will be able to independently carry out design and implementation activities of research programs, and develop critical skills for the analysis of new ideas and new or existing processes. The training will be conducted in qualified operational and scientific facilities for study and research activities and in a strongly international environment. Various external research facilities are involved in the provision of the training and research activities, in agreement with the doctorate, which can finance additional grants and host students for research and training activities in their own venues. The faculty council includes researchers from prestigious research institutions, such as the Research Center for Cereal and Industrial Crops (CREA Foggia) and the Mediterranean Agronomic Institute (CIHEAM-BARI), which is an international training and research institution, as well as a professor from the University of Bari and two academics from foreign universities (Spain and Greece). The department also has several agreements with international universities research bodies that include, amongst their purposes, the exchange of researchers and doctoral students that for the previous doctoral course has activated several thesis projects in co-supervision with foreign universities. Finally, an agreement with the Universities of Udine and Catania is underway for joint training activities, which involves the organization of an annual event where students of various years present the progress of their research projects in a meeting organized in the form of a conference, where the professors of the universities involved and / or invited speakers open work sessions with transdisciplinary key notes and whose scientific committee is comprised of students. In line with the pillars of the PNRR, social and territorial cohesion and gender inclusion will be favoured.

Short description of the research projects referred to in the PNRR (Ministerial Decrees 351 and 352 of 2022):

The research activity of this doctoral course, as proved by the title, is part of the scope: "Food, bioeconomy, natural resources, agriculture, environment" and includes the sub-areas identified by the experts appointed by the ministry such as: I. Green technologies, II. Food Sciences and Technologies, III. Bioindustries for the Bioeconomy and IV. Knowledge and management of agricultural and forestry resources. It will be essential to promote the advancement of knowledge in the field of sustainable agriculture and circular economy (M2C1); renewable energies and hydrogen (M2C2); the digitalization of the production system (M1C2); the protection of the territory (M2C4). This will be possible thanks to the training activities and research projects that are well integrated into the subject matters referred to by these measures (missions and investments). In particular, the projects will concern: the circular economy; the logistics of agri-food systems; strategies to increase the consumers and actors' awareness in the supply chain on environmental issues; biomethane production; digitalization and mechanization in agriculture; reduction of inputs in agriculture; digitalization and automation of agri-food systems; climate change impact; enhancement of animal, plant and microbial biodiversity; enhancement of the typicality of agri-food products; eco-friendly transformation technologies; biotechnologies applied to agricultural production; biotechnology for food processing; efficiency of production processes and waste reduction; analysis of the sustainability of products and production processes. All research activities carried out will comply with the "do not cause significant harm" (DNSH) principle pursuant to art. 17 of Regulation (EU) 2020/852 in line with the technical guidelines designated by the European Commission (Communication of the European Commission 2021 / C58 / 01).

With regards to the 352 grants financed by companies, the general subjects of interest are listed; topics will be refined once students and tutors will be identified. Interested candidates may submit research projects relating to these subjects; or alternatively, they may indicate preferential curriculum and subject.

No. 2 grants co-financed by: ENBIOTECH SRL on "Phylogenetic study and molecular diagnosis of populations of plant and fungal pathogens responsible for the quantitative and qualitative decrease in agricultural production and commodities";

No. 2 grants co-financed by: RIDER-Robot Innovation Development & Research S.R.L. on "Vision and artificial intelligence for the recognition and mechanized harvesting of grapes and kiwifruits (RGB and hyperspectral Vis-NIR images)";

No. 1 grant co-financed by: INNOVA Srl on "Innovative precision technologies for food processing and stabilization (robotics, 3D printing, vision and cutting systems) - Precision food manufacturing";

No. 1 grant co-financed by: Scienzanova Srl on "Microbial biotechnologies for a sustainable management of food products";

No. 1 grant co-financed by: SIMEONE SPA on "Maintenance of water and sewage networks,



leak detection, purification plants”;

No. 1 grant co-financed by: SAIM SERVICE srl on “Sanitation and disinfection of cereals, dried fruit and dehydrated vegetables”;

No. 1 grant co-financed by: Sistemi Energetici SpA on “Upcycling of organic matter through combined biochemical (anaerobic digestion) and thermochemical (pyrogasification) processes”;

No. 1 grant co-financed by: CBC (EUROPE) SRL on " Study of the biological activity of insect semiochemicals and development of sustainable control applications ";

No. 1 grant co-financed by: ORCHIDEA S.R.L. on “Waste management and characterization”

Admission prerequisites:

Master's Degree in:

LM-3 Landscape architecture

LM-6 Biology

LM-7 Agricultural biotechnologies

LM-8 Industrial biotechnology

LM-9 Medical, veterinary and pharmaceutical biotechnologies

LM-17 Physics

LM-18 Computer science

LM-21 Biomedical engineering

LM-22 Chemical engineering

LM-23 Civil engineering

LM-24 Construction engineering

LM-25 Automation engineering

LM-26 Safety engineering

LM-27 Telecommunications engineering

LM-28 Electrical engineering

LM-29 Electronic engineering

LM-30 Energy and nuclear engineering

LM-31 Industrial engineering

LM-32 Computer engineering

LM-33 Mechanical engineering

LM-35 Environment and territory engineering

LM-41 Medicine and surgery

LM-42 Veterinary medicine

LM-48 Urban and environmental development planning

LM-52 International relations

LM-53 Science and engineering of materials

LM-54 Chemical Sciences

LM-56 Economic Sciences

LM-59 Sciences of public communication, business and advertising

LM-60 Natural sciences

LM-61 Human Nutrition Sciences

LM-69 Agricultural sciences and technologies

LM-70 Food science and technology

LM-71 Sciences and technologies of industrial chemistry

LM-73 Forestry and environmental sciences and technologies

LM-74 Geological sciences and technologies

LM-75 Sciences and technologies for the environment and the territory

LM-77 Economics and business sciences

LM-79 Geophysical Sciences

LM-82 Statistical Sciences

LM-83 Statistical, actuarial and financial sciences

LM-86 Zootechnical sciences and animal technologies

LM / GASTR Economic and social sciences of gastronomy

LM Sc. Mat. Materials sciences
LM-53. Materials engineering
6 / S (Master of biology)
7 / S (Master of agricultural biotechnology)
8 / S (Master of industrial biotechnology)
9 / S (Master of medical, veterinary and pharmaceutical biotechnologies)
19 / S (Master of finance)
20 / S (Master of physics)
23 / S (Master of computer science)
26 / S (Master of biomedical engineering)
27 / S (Master of chemical engineering)
29 / S (Master of automation engineering)
30 / S (Master of telecommunications engineering)
31 / S (Master of electrical engineering)
34 / S (Master of industrial engineering)
35 / S (Master of computer engineering)
36 / S (Master of mechanical engineering)
38 / S (Master of environment and territory engineering)
46 / S (Master of medicine and surgery)
47 / S (Master of veterinary medicine)
50 / S (Master of mathematical-physical modeling for engineering)
54 / S (Master of urban and environmental development planning)
59 / S (Master of advertising and corporate communication)
61 / S (Master of materials science and engineering)
62 / S (Master of chemical sciences)
64 / S (Master of economics)
68 / S (Master of natural sciences)
69 / S (Master of human nutrition sciences)
77 / S (Master of agricultural sciences and technologies)
78 / S (Master of agri-food sciences and technologies)
79 / S (Master of agri-zootechnical sciences and technologies)
81 / S (Master of sciences and technologies of industrial chemistry)
82 / S (Master of sciences and technologies for the environment and the territory)
83 / S (Master of economic sciences for the environment and culture)
84 / S (Master of economics-business sciences)
85 / S (Master of geophysical sciences)
86 / S (Master of geological sciences)
90 / S (Master of demographic and social statistics)
91 / S (Master of economic, financial and actuarial statistics)

Admission procedures:

The selection will take place based on the assessment of qualifications, research project and oral exam.

Qualifications titles should be listed as follows:

Degree and final grade

- admission degree and final grade

With regards to this qualification, if candidates hold a foreign degree the examination board has the right to amend or exclude this qualification in favour of the following ones

Degrees and academic qualifications:

- Additional degrees over the admission criteria;
- PhD
- Postgraduate and Master's degree
- Postgraduate specialization courses

- Specialization diplomas

Research activity at qualified Italian and foreign institutes relevant to the contents covered throughout the doctoral course applied for. Participation in European projects.

- Please indicate the type of position, duration and institute
- Please provide project, duration and role details

Scientific publications and patents:

- Journal publications on SCOPUS
- Patents
- Publications not present on SCOPUS
- Book Chapter
- Conference proceedings
- Abstracts/posters presented at conferences

Awards

- Please provide reason, qualification and date of the award/s.

Oral exam

During the oral exam, the research project presented by the candidate at the time of the application will also be discussed and the knowledge of the English language will be ascertained. It will be up to the candidate to take the exam in English.

The assessment will take place pursuant to art. 6 of the selection notice.

Test completion methods for foreign candidates:

Foreign candidates can choose to take the admission test in English.

Admission test calendar and venue:

Oral test: 21 September 2022 at 9.30.

Test venue: the oral test will take place online for all candidates. The email address provided by the candidate will be used to arrange the platform and the related *virtual rooms* for connection.

For further information please visit:

<https://www.unifg.it/it/studiare/post-lauream/dottorati-di-ricerca>