PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

Yahia Farès University of Médéa

Faculty of Sciences

PhD PROGRAM OFFER

FOR THE ACADEMIC YEAR 2024/2025

Field: Applied Microbiology

1- Global Objective of the Doctoral Project

Applied microbiology is a specialty that studies microorganisms in various contexts, focusing on their impact on human health and the environment. This field aims to understand how pathogenic agents such as bacteria and viruses interact with living beings and contribute to diseases. The applied microbiology program trains students to diagnose and treat infections caused by microorganisms, enabling them to develop preventive and therapeutic strategies. Upon completion of their training, graduates possess the knowledge and skills necessary to analyze the complex interactions between microorganisms and their hosts. They can contribute to various fields such as medicine, scientific research, and environmental protection. Additionally, they learn to use biological methods to combat diseases, relying on extracts and essential oils from medicinal plants as alternatives to chemical medications, which may cause long-term side effects.

2- Curriculum Highlights

The doctoral program in applied microbiology aims to enhance students' skills in the following advanced topics:

- ✓ Molecular Biology of Pathogens: Study of the genes and mechanisms used by pathogens to infect hosts.
- ✓ Epidemiological Modeling: Development of models to predict the spread of diseases based on environmental conditions and agricultural practices.

- ✓ Genetic Editing: Development of resistant strains through genetic modifications.
- ✓ Advanced Biological Control: Utilization of microorganisms to reduce pest populations.
- ✓ Tripartite Interactions (Plant–Pathogen–Beneficial Microorganisms): Understanding the effect of beneficial microorganisms on plant resistance.

3- Access to Doctoral Training

Candidates must meet the following requirements and submit the following documents:

1-Master's Degree (or equivalent) in Biological Sciences or Life Sciences.

2-Curriculum Vitae.

3-Transcripts and graduation certificates.

4-Academic Letters of Recommendation.

4- Core Courses

During the initial years of training, the PhD student is required to attend advanced courses that support their scientific research and provide them with modern methodological and technical tools. The core courses include:

- ✓ Parasitology
- ✓ Molecular Biology
- ✓ Applied Microbiology
- ✓ Medical Physiology
- ✓ Secondary Metabolism and Metabolism
- ✓ Analysis of Experimental Data

5- Advanced Topics

The doctoral program in applied microbiology aims to enhance students' skills in the following advanced topics:

1. **Molecular Biology of Pathogens**: Study of the genes and mechanisms used by pathogens to infect hosts.
2. **Epidemiological Modeling**: Development of models to predict the spread of diseases based on environmental conditions and agricultural practices.
3. **Genetic Editing**: Development of resistant strains through genetic modifications.

4. **Advanced Biological Control**: Utilization of microorganisms to reduce pest populations.
5. **Tripartite Interactions (Plant–Pathogen–Beneficial Microorganisms)**: Understanding the effect of beneficial microorganisms on plant resistance.

6- Knowledge Enhancement Training Program

Activities	Semester 1	Semester 2
Specialty reinforcement courses related to doctoral training	Parasitology 26h	Biologie moléculaire 26h
	Applied Microbiology 26h	Medical Physiology 26h
	Metabolite and secondary metabolism 26h	Experimental data analysis 26h