

**COURSES DESCRIPTION FOR PhD. PROGRAM OF**  
**MICROBIOLOGY 20 Hours**

**FIRST LEVEL 10 UNITS**

**611MBio: Molecular Biology of Viruses 2 (2+0)**

Introduction on the molecular biology of plant, animal and bacterial cells. Transcription, translation and replication of different viruses. Gene expression in vitro and in vivo-laboratory applications, genetic maps-interactions with host-activities.

**621MBio: Advanced studies in Bacteriology 2 (1+1)**

Studying the laws of thermodynamics governing energy relations in different systems and through bacterial enzymes and their accompanying, In addition to discussing and following up the modern scientific applications in bacteriology in the relevant scientific journals.

**631MBio: Advanced Biology of Fungi 2 (1+1)**

Structure and function of fungi, growth and nutrition dispersal of fungi, ecology of saprophytic fungi, fungal genetics, resistance virulence.

**671MBio: Advanced topics in Microalgae 2 (2+0)**

Study the vital roles that algae play in the ecosystem, How to use algae photosynthesis in green energy technology to combat climate change, and utilize modern algae production technologies to contribute to food security, economic development, and environmental sustainability as part of the strategic goals of Vision 0230.

**691MBio: Seminar 1 (1+0)**

Guides the student to scientific sites including the introduction of scientific innovations in the field of specialization to gain more knowledge and build a research work plan.

## **699MBio : Thesis Proposal Preparation1(1+0)**

These are the initial steps that the researcher sets out to follow in writing his scientific research fully, thus obtaining the desired results according to the internationally defined criteria.

## **SECOND LEVEL 9 UNITS**

### **612MBio : Technology and new Advancement in Virology 2 (2+0)**

Studies on viruses infecting tissue cultures and protoplast methods for detection of viral infections and diagnosis using molecular probes, recombinant DNA technology, gene description and mapping techniques on genetic engineering and the epidemics.

### **622MBio: Advanced Pathogenic Bacteria 2 (2+0)**

Expand the study of pathogenic pathways in bacteria and how to target stopping the mechanics of the disease while highlighting the precise and modern diagnostic procedural methods to control the disease.

### **623MBio: Antibacterial agents and plasmids 2 (1+1)**

An advanced study of antibiotics from of biology and chemistry perspective, as well as knowledge of antibiotic resistance in molecular biology considering the mechanisms of antibiotic resistance that occur besides the resistance plasmids.

### **632MBio: Advanced fungal parasitism 2 (2+0)**

Fungal life-style. Plants as an environment fungus plant conformation. Effects of pathogenic fungal infusion on host plant plant physiology. Biotechnology in the study of fungus-plant interactions.

**633MBio: Advanced studies in fungal symbiosis 2 (1+1)**

Detailed study of physiology and structure of symbiotic fungi, host-symbiont interactions, their effects on host growth and their agricultural applications.

**641MBio: Advanced microbial ecology 2 (2+0)**

Concepts in ecology as applied to microbial systems including analysis of communities, interactions and biogeochemical factors. Identify the role of microbes in sustainable environmental security.

**651MBio: Applied Serology and Vaccines 2 (1+1)**

Basis of immunology; revision. Sera and serological techniques in identification of bacteria, viruses, fungi and protozoa and their application techniques of monoclonal antibodies. Vaccines technology and design and against viral, bacterial, fungal protozoa diseases-new developments.

**652MBio: Techniques in microbial molecular genetics2 (2+0)**

Genetic manipulation of bacteria, virusus, bacteriophage and yeast. Fundamentals of gene splicing and molecular cloning. Applications.

**661MBio: Spores biology 2 (2+0)**

Studying the history of spores, defining and classifying them according to structure, movement and function, in addition to identifying the mechanics of their formation, germination, life cycle and their role in pollution and infection.

**662MBio: Advanced medical microbiology** **2 (2+0)**

Pathogenesis of bacterial, fungi and viruses. The major epidemic diseases. Immune interaction chemotherapy, vaccination and control measures. Gene therapy.

**692MBio: Special topics 3 (2+1)**

Advanced topics in microbiology keep pace with the scientific and technological revolution (viruses - bacteria - fungi algae) correspond to the specialization of the student and guide the supervisor of the thesis.

**700MBio: Comprehensive Exam 0(0+0)**

**700MBio: Dissertation 1(1+0)**

Students learn to tackle a problem of specialization that is unique in its depth and originality in order to provide innovative solutions based on a deep understanding of the basics of specialization.