



## M.SC. in Microbiology

The student should study (30) credits, 24 units as courses and 6 units to conduct research, prepare and submit M.Sc. thesis. The student should pass the courses with grade of "very good" minimum. Student then should perform his/her research in Microbiology, which include; Bacteriology, Mycology, Phycology, and Virology.

### Level (Semester) 1

Course code	Name	units
511 MBio	<u>Advanced Virology</u>	2(1+1)
521 MBio	<u>Advanced bacteriology</u>	2(1+1)
531 MBio	<u>Advanced mycology</u>	2(1+1)
561 MBio	<u>Advanced Microbial physiology</u>	2(1+1)
571 MBio	<u>Advanced studies in micro algae</u>	2(1+1)

#### 511 MBio: Advanced Virology. 2(1+1)

Introduction, General properties of viruses, Methods in virology, RNA viruses, Viruses using reverse transcriptase, DNA viruses, Virus like infectious agents, Transformation by DNA and RNA viruses, Immunization against viruses, Interferons, Viruses as tools in medicine and biotechnology.

#### 521 MBio: Advanced bacteriology. 2(1+1)

Structure and function of the prokaryotic cell, metabolic diversity. Bacterial symbionts in animals and plants. Pathogenic bacteria in humans, from free-living to pathogen: Adaptation to pathogenicity. Bacterial disease mechanisms. Infectious biology in humans of selected bacteria.



### 531 MBio: Advanced Mycology 2(1+1)

Experiential based course in Advanced Mycology that will contain lecture and lab discussion current methodology and techniques in working with fungi.

### 561 MBio: Advanced Microbial physiology 2(1+1)

Biochemistry and genetics of microbial processes with an emphasis on learning advanced laboratory techniques. Microbial physiology with an emphasis on metabolic processes.

### 571 MBio: Advanced studies in microalgae 2(1+1)

Introduction to the groups of microscopic protists, especially those with photosynthetic capacity Culture media for freshwater, marine and estuarine species.

Isolation methods. Growth conditions and culture maintenance.



## Level (Semester) 2

Course code	Name	units
522 MBio	<u>Bacterial infection mechanisms</u>	2(1+1)
532 MBio	<u>Mycotoxins</u>	2(1+1)
566 MBio	<u>Microbiological Biotechnology</u>	2(1+1)
572 MBio	<u>Biology of cyanophyta</u>	2(1+1)
591 MBio	<u>Special topics</u>	2(2+0)

### 522 MBio Bacterial infection mechanisms 2(1+1)

Presents the mechanism employed by bacteria to establish and maintain infection in the human host and evolution of host resistance mechanisms. Host-pathogen relationship, bacterial structure and metabolism, pathogenic mechanisms of bacteria, systemic and mucosal immunity, major Gram-negative and Gram-positive bacterial pathogens, antibiotic resistance, bacterial vaccines, and role of microbiome in health and disease.

### 532 MBio Mycotoxins . 2(1+1)

Familiarize participants with the regulation concerning mycotoxins in food and fit-for-purpose laboratory methods to identify and quantitate mycotoxins.

### 566 MBio Microbiological Biotechnology 2(1+1)

Application of modern techniques of genetics and physiology to the large-scale production of microbial products; industrial strain improvement; scale-up of microbial processes; survey of industrial processes using microorganisms

### 572 MBio Biology of cyanophyta 2(1+1)

Structure. Photosynthesis. Ecology.

### 591 MBio Special topics 2(2+0)

Selective topics in Microbiology.



### Level (Semester) 3

Course code	Name	units
555 MBio	<u>Molecular Microbiology</u>	3(2+1)
592 MBio	<u>Seminar</u>	1(1+0)

#### 555 MBio Molecular Microbiology 3(2+1)

Molecular basis of bacterial physiology and genetics with emphasis on molecular mechanisms; topics include nucleic acid-protein interactions, transcription, translation, replication, recombination, regulation of gene expression. The range of molecular mechanism utilized to control gene expression in bacteria.

#### 592 MBio Seminar 1(1+0)

Reviews of microbiological subjects, and reports on research work

### Level (Semester) 4

Course code	Name	units
600 MBio	<u>Thesis</u>	6 (6 +0)

#### 600 MBio Thesis 6(6+0)

Full lab and literature review of a problem in microbiology. Leads to preparation of thesis and publication