Microbiology and Immunology Department

- **Vision**

To be distinguished student in basic and applied research of pharmacy as well as qualified education in medical and environmental microbiology.

- **Mission**

The mission of the department is to provide excellence in education, research and community service to the students of O6U.

- **The department teaches the following courses:**

Course Code	Course Name
MIC 201	General Microbiology
MIC 202	Pharmaceutical Microbiology
MIC 304	Medical Microbiology and Immunology
MIC 405	Public Health
MIC 506	Biotechnology

- **The department Supervises teaching the following courses:**

Course Code	Course Name
MIC 303	Pathology and Parasitology

Laboratories of Microbiology and Immunology Department			
Laboratory	**Lab no.**	**Floor**	**Location**
Preparation Room	**201**	**Under Ground**	**Saad Zaghloul Building**
1	**201-A**		
2	**201-B**		
3	**202**		

- **Course description:**

Second Level
2- Second semester

Code	**MIC 201**	**Credit hours**

Title	General Microbiology	L*	P/T**	Total
Pre-requisite	None	2	1	3

Course content:
General microbiology course covers the basic concepts of microbial classification, identification, structure, nutrition and metabolism, and growth requirements. Microbial genetics with emphasis on molecular biology (structure and function of nuclear material, protein synthesis and its regulation, gene expression, microbial variation, mechanisms of genetic recombination, recombinant DNA technology).

Code	MIC 202	Credit hours		
Title	**Pharmaceutical Microbiology**	**L***	**P/T****	**Total**
Pre-requisite	None	1	1	2

Course content:
Pharmaceutical Microbiology course covers the introduction to sterilization, different sterilization methods (dry and moist heat sterilization, cold sterilization: gaseous, radiation, filtration), their significance, validation of the sterilization processes and limitations, their applications in the pharmaceutical industry, aseptic area and its validation and sterility testing. Antimicrobial agents including major classes of antibiotics, antibacterial, antifungal, antiviral agents, their mechanisms of action, side effects, development of resistance, their evaluation, and antibiotic policy. Non-antibiotic agents (disinfectants, antiseptics preservatives), their evaluation, pharmaceutical and surgical applications. The sources of contamination of pharmaceutical products and the use of preservatives in pharmaceutical industry.

Third Level
1- First semester

Code	MIC 303	Credit hours		
Title	**Pathology and Parasitology**	**L***	**P/T****	**Total**
Pre-requisite	Pathophysiology	2	1	3

Course content:
Pathology course includes the following:

- Introduction to general pathology, including definition, causes, symptoms, signs and gross picture changes of inflammation (acute and chronic types) and the difference between them.
- Cell injury and healing.
- Disturbances of circulation (edema, thrombosis, embolism, ischemia, infarction, gangrene).
- Growth disturbances (hypertrophy, atrophy, hyperplasia, dysplasia and metaplasia).
- Neoplasia (tumors) including general aspects of benign and malignant tumors, nomenclature and examples.
- Heart, respiratory system, gastrointestinal tract and liver diseases.
- Diseases of the bones and joints.

Parasitology course includes the following:

Introduction to parasitology. Protozoa (intestinal, urogenital, tissue and blood protozoal diseases with emphasis on Entamoeba, Balantadium coli, Giardia lambella, Trichomonas vaginalis, malaria, trypanosomasis and leishmaniasis) and helminthes (trematodes with emphasis on H. heterophyes, Schistosoma and Fasciola; cestodes with emphasis on Taenia and Echinococcus; and nematodes with emphasis on Ascaris, Ankylostoma, Enerobius): life cycle, infective stages and mode of transmission, epidemiology, control, laboratory diagnosis and chemotherapy. Arthropods and arthropods borne diseases and infestations.

Code	**MIC 304**	**Credit hours**		
Title	**Medical Microbiology and Immunology**	**L***	**P/T****	**Total**
Pre-requisite	General Microbiology**,** Pharmaceutical Microbiology	2	1	3

Course content:

- This course of Medical Microbiology provides a concise information on medically important infectious diseases related to different groups of microorganisms (bacteria, fungi, viruses) covering sources of infection, mode of transmission, virulence factors, pathogenesis, clinical symptoms, laboratory diagnosis, treatment and prevention and control. It covers Gram positive and Gram bacteria, acid fat bacteria, spirochetes, rickettsia and chlamydia, introduction to viral unfections, DNA and RNA viruses, introduction to mycotic infections, superficial mycosis, subcutaneous and deep mycosis. Application of the content of course in the form of clinical cases.
- The course of Immunology covers immunity, cellular basis of the immune response, antigens and antibodies, humoral immunity, cell-mediated immunity, immunization, major histocompatibility complex and transplantation, complement system, antigen-antibody reactions in laboratory, hypersensitivity, tolerance and immune diseases, tumor immunity and immunodeficiency.

Fourth Level

1- First semester

Code	**MIC 405**	**Credit hours**		
Title	**Public Health**	**L***	**P/T****	**Total**
Pre-requisite	Medical Microbiology and Immunology	1	--	1

Course content:

This course covers the following: Study of epidemiology of communicable diseases, methods of epidemiological studies, mode of transmission of infection, disease prevention and control, immunization, nosocomial infections, obesity and overweight, food microbiology and food poisoning, foodborne and waterborne infections. Noncommunicable diseases (circulatory diseases, cancer, diabetes mellitus), nutrition and malnutrition diseases. Water sources, water impurities and purification, water analysis, water borne diseases. Milk sanitation and analysis. Waste water and sewage treatment. Disposal of dry refuse, radioactive and industrial wastes. . Occupational health and occupational diseases. Family health (Maternal and child health) and geriatric health are included in the course.

Fifth Level

2- Second semester

Code	MIC 506	Credit hours		
Title	**Biotechnology**	**L***	**P/T****	**Total**
Pre-requisite	Medical Microbiology and Immunology, Biotechnology of Medicinal Plants	1	1	2

Course content:

This course covers the following: Introduction to the development of traditional and modern biotechnology, biotechnological resources and techniques, upstream and downstream processes, fermentation technology (batch, fed-batch, continuous), immobilized enzyme technology. bioreactors. Categories of biotechnology products (biomass, enzymes, primary and secondary microbial metabolites etc.). Genetic engineering (recombinant DNA technology) and its biotechnological applications. Biotechnology applications in health (antibiotics, amino acids, sugars, organic acids, enzymes, vitamins, therapeutic proteins and peptides, immunological products) and environment (biodegradation, bio-fertilizers, microbial insecticides, biogas, recovery of metals etc.). Quorum sensing, microarrays and bioinformatics in biotechnology.

- **Elective Courses:**
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Code	MIC 600	Credit hours		
Title	**Environmental Microbiology**	**L***	**P/T****	**Total**
Pre-requisite	Public Health	1	1	2

Course content:

This course provides a general introduction to the diverse roles of microorganisms in natural and artificial environments. It will cover topics including: cellular architecture, energetics, and growth; evolution and gene flow; population and community dynamics; water and soil microbiology; biogeochemical cycling; and microorganisms in biodeterioration and bioremediation.