

# The University of Jordan

Faculty: Pharmacy  
Program: Pharmacy

Department: Pharmaceutics & Pharmaceutical technology  
Academic Year/ Semester: 2013/2014

## Pharmaceutical Microbiology I (Course Number: 1202341)

<b>Credit hours</b>	3	<b>Level</b>	3 <sup>rd</sup> yr	<b>Pre-requisite</b>	Pharmaceutical microbiology I
<b>Coordinator/ Lecturer</b>		<b>Office number</b>		<b>Office phone</b>	
<b>Course website</b>		<b>E-mail</b>		<b>Place</b>	

<b>Office hours</b>					
<b>Day/Time</b>	<b>Sunday</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>

### Course Description

1. Introduce the students for the basics of microbiology; bacterial, viral & fungal structure.
2. Introduce the students for the different factors that affect microbial growth; nutrients, temperature, pH
3. Introduce the students for the methods used for counting bacteria in different samples
4. Introduce the students for the principles of taxonomy
5. Introduce the students to different chemotherapeutic agents (antibiotics & other antimicrobials).
6. Introduce the students to epidemiology
7. Introduce the students to different host- microbe relationships
8. Introduce the students to different infectious diseases of some body's systems
9. Introducing the students to immunology (innate & specific host defences) & some immunological disorders

### Learning Objectives

Know the historical background of microbiology & the development of antimicrobial treatment  
Know the techniques used to prepare samples to be visualized by microscopes & the different micr

Know the basic structure of various microbes & their effect on microbial resistance  
Know the factors affecting microbial growth  
Know the basics of taxonomy  
Know the different relationships between hosts & microbes  
Know the basics of epidemiology & measures needed to limit disease spreading  
Know the basics of immunology, host defences & immunological disorders  
Know some infectious diseases, their signs & symptoms & treatment.

### **Intended Learning Outcomes (ILOs):**

Successful completion of the course should lead to the following outcomes:

#### **A. Knowledge and Understanding:** Student is expected to

- A.1 Know the importance of studying microbiology its scope, the major events in the early history of microbiology, the germ theory of disease and the historical developments led to its formulation
- A.2 Know how the evolution in microscopy and staining led to progress in microbiology, and to get introduced to the light microscopy and electronic microscopy.
- A.3 To get introduced to the common types of microbial stains, and the functions and results of each steps in the Gram staining procedure
- A.4 know the dichotomous key used for naming microorganisms, and the significance of Bergey's manual as a microbiology reference
- A.5 Know the general characteristics of prokaryotic and eukaryotic cells
- A.6 Know how prokaryotic cells differ in size, shape and arrangements
- A.7 Know the structure and function of different components of the bacterial cell wall, cell membrane, internal structures, external structures
- A.8 Know what is sporulation and its significance to microorganisms
- A.9 Know the definition of bacterial growth, the different phases of bacterial growth and how it is measured.
- A.10 Know the different physical factors that affect of bacterial culture growth
- A.11 Know the different methods used to obtain a pure culture
- A.12 Know the commonly used media and the different nutritional requirements supplied to them, and the differences between selective, enrichment and differential media and their uses
- A.13 Know the general characteristics of viruses, how they are classified and cultured
- A.14 Know the methodology of bacterial and animal viruses replication
- A.15 Know how viruses cause latent infection, teratogenic effect and cancer
- A.16 Know the properties of virus like agents
- A.17 Know what is a parasite and what are the principles of parasitology
- A.18 Know what are fungi and their importance, classifications
- A.19 Know the different parasitic helminthes groups
- A.20 Know the meaning of chemotherapy and antibiotics
- A.21 know the meaning of selective toxicity, spectrum of activity in the context of antimicrobial agents.
- A.22 Know the meaning, causes and the proper way to control microbial resistance towards antimicrobial agents.
- A.23 Know the properties, uses, side effects, and mode of action of antibacterial agents.
- A.24 Know the properties, uses, side effects, and mode of action of antifungal, antiviral, antiprotozoan agents and antihelminthic agents.
- A.25 Know the meaning of different terminology used to describe the microbe-host relationships.
- A.26 Know the meaning of the following terminology, contamination, infection, infectious disease, notifiable infectious diseases, nosocomial infections, non-infectious diseases, communicable and non-communicable infectious diseases, pathogens, pathogenicity, virulency.

- A.27 Know the significance of normal flora as a defence mechanisms, the different body normal flora and its classification
- A.28 Know how microbes can cause infectious disease and the different stages that occur in the course of an infectious disease and what is meant by intoxicification
- A.29 Know certain terms used by epidemiologists to describe situations related to infectious diseases
- A.30 Know the difference between specific and non-specific defense mechanisms
- A.31 Know the different non-specific defense mechanisms (physical barriers, cellular defences, molecular defenses, inflammation and fever), their exact role in the non-specific defense mechanisms
- A.32 Know what is innate, acquired, active and passive immunity and how they differ.
- A.33 Know the properties of antigens and antibodies
- A.34 Know the properties of the immune system, its recognition of self versus non-self, specificity, heterogeneity and immunological memory.
- A.35 Know the components and functions of the humoral immunity and the process of the primary immune reaction and secondary immune reaction.
- A.36 Know the components and functions of the cell-mediated immunity
- A.37 Know the mechanisms of immunization and the recommended immunizations and the benefits and hazards of immunization
- A.38 know the basis of different immunological disorders (hypersensitivity reaction type I, II, III, IV) and the role of the immune system in those disorders
- A.39 know the infectious diseases of human organ system, for each organ know the normal flora, the different infectious agents, their pathogenicity and virulency, main signs and symptoms, the control of this infectious disease, by the host or by antimicrobial agents and the prevention by immunization and preventive measures. Diseases of the skin and eyes, urogenital and sexually transmitted diseases, Respiratory tract diseases, oral and gastrointestinal diseases, cardiovascular, lymphatic and systemic disease and nervous system diseases.

**B. Intellectual, Analytical and Cognitive Skills:** Student is expected to

- B.1 Identify the different types of microorganisms
- B.2 Decide a suitable method for microbial counting
- B.3 Recommend the first line antimicrobial therapy for different microorganisms
- B.4 Specify the outcome of the deviation of the host non-specific and specific host defence mechanisms from normality on the individual health
- B.4 Recommend the best protective and prophylactic method against infectious disease
- B.5 Advise people on the virulency and pathogenicity of different microorganisms and the different protective measures to be taken
- B.6 Decide the suitable microscopic method to visualize microorganisms

**C. Subject-Specific Skills:** Student is expected to

- C.1 The ability to prepare different microbial samples to be visualized by microscopes
- C.2 The ability to select the suitable microscopic method to study microorganisms
- C.3 The ability to grow bacteria & fungi for further studies
- C.4 The ability to link certain microorganism to its taxa & accordingly to its therapeutic agent
- C.5 The ability to evaluate the severity of disease from its epidemiological data
- C.6 The ability to evaluate some immunological diseases from clinical laboratory results
- C.7 Initial identification of infectious diseases from their signs & symptoms
- C.8 Select the suitable antimicrobial agent for treating infectious diseases

**D. Transferable Key Skills:** Students is expected to

D.1 Communicate with the patients on the appropriate antimicrobial treatment and the prophylactic and preventive measures against different infectious disease

D.2 Communicate with the health professional on the different infectious agents and their control.

D.3 Communicate with the health professional on the different immunological disorders & their etiology

### **ILOs: Learning and Evaluation Methods**

<b>ILO/s</b>	<b>Learning Methods</b>	<b>Evaluation Methods</b>
	<b>Lectures Discussions</b>	<b>Exams, Quizzes</b>

### **Course Contents**

<b>Content</b>	<b>Reference</b>	<b>Week</b>	<b>ILO/s</b>
1. Scope & history of microbiology	Black, J.	1	
2. Microscopy & staining	Black, J.	1,2	
3. Characteristics of Prokaryotic and Eukaryotic cells	Black, J.	2,3	
4. Growth & culturing of bacteria	Black, J.	4	
5. An introduction to taxonomy	Black, J.	5	
6. Viruses	Black, J.	5	
7. Eucaryotic Microorganisms and Parasites	Black, J.	6	
8. Antimicrobial chemotherapy	Black, J.	7,8	
9. Host microbe relationships and disease processes	Black, J.	8	
10. Epidemiology and nosocomial infections	Black, J.	9	
11. Nonspecific host defences and host systems	Black, J.	10	

12. Immunology I: Basic principles of specific immunity and immunisation	Black, J.	11,12	
13. Immunology II: Immunological disorders	Black, J.	13	
Infectious Diseases of Human Organ Systems	Black, J.	14, 15	

### **Learning Methodology**

**Lectures**

**Discussions**

### **Evaluation**

<b>Evaluation</b>	<b>Point %</b>	<b>Date</b>
<b>Midterm Exam</b>	<b><u>30%</u></b>	<b><u>To be announced</u></b>
<b>Quizzes</b>	<b><u>10% each</u></b>	
<b>Final Exam</b>	<b><u>50%</u></b>	<b><u>To be announced</u></b>

### **Main Reference/s:**

Black, J.G. Microbiology: principles and explorations, latest edition.

### **References:**