

Kingdom of Saudi Arabia
Alfarabi Private Colleges
Medicine School



المملكة العربية السعودية
كليات الفارابي الأهلية
طب بشري



Principles of Diseases I

Course specifications



Code: PODI 241

Title: Principles of diseases I

Year: Two

Level: Four

No. of weeks: Eight

Type of educational unit: Longitudinal course



Integrated block



No of credit hours: 4 (2+1+1)

Pre-requisites for the course: None

Course principle coordinator:

Course support coordinator:

Members of the Coordinating Committee:

- 1-
- 2-
- 3-

Description

This block aims to cover the basic knowledge of general microbiology and parasitology beside focuses on the fundamental cellular and tissue responses to pathologic stimuli and the natural history of these responses. It deals with the morphology, cellular and molecular structure, classification, growth, and replication of human pathogens such as: bacteria, viruses, fungi, and parasites. Also it deals with host-pathogen relationships as well as concepts and applications of molecular microbiology.

By the end of the block students should be able to understand the structure and function of the prokaryote and lower eukaryote as it pertains to their pathogenesis and susceptibility to antibacterial and antifungal agents. In a wet lab environment, based on case studies, students will learn how important bacterial and fungal pathogens are isolated and identified in the clinical laboratory and tested for their susceptibility to antimicrobial agents so that rational therapy can be instituted. Students will learn the mechanisms of genetic exchange between bacteria and their importance in the transfer of antibiotic resistance and virulence determinants.



The block also enables students to acquire knowledge of the biology of important viral pathogens which can be applied to understanding the pathogenesis of these obligate intracellular parasites. The rational basis of antiviral therapy and its limitations will also be considered.

As time does not allow for the inclusion of all of the important microbial pathogens, students should be required to read about those that are not covered in class in their textbook(s). **Questions about these microorganisms will be included in the examination.**

Objectives

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	Knowledge		
1.1	Outline the biochemical, molecular and cellular mechanisms that are essential for maintaining body homeostasis. (SaudiMEDS-1.3).	Lectures & tutorials	Written examinations
1.2	Describe and explain the basic aspects of common clinical presentations (SaudiMEDS-1.8)	Lectures & tutorials	Written examinations
1.3	Recognize the importance of biological and non-biological (psychological, social, cultural, and environment factors) determinants that contribute to health of diverse populations. (SaudiMEDS-9.2)	Lectures & tutorials	Written examinations
1.4	Describe the morphology, structure, genetic make-up, metabolism, and replication, systematic classification of pathogenic cells such as bacterial, fungal and viral cells.	Lectures & tutorials	Written examinations
1.5	Describe the different bacterial floral populations in the human body.	Lectures & tutorials	Written examinations
1.6	Describe the epidemiology of emerging infectious diseases in the KSA.	Lectures & tutorials	Written examinations
1.7	Describe Gram positive and Gram negative bacteria and the different infection caused by different types and how specimens are collected for microbial investigations.	Lectures & tutorials	Written examinations
1.8	Describe the nature and mechanisms of action of bacterial virulence factors.	Lectures & tutorials	Written examinations



1.9	Define chronic bacterial infection syndrome, the bacteria causing, and its management.	Lectures & tutorials	Written examinations
1.10	Describe different types of sepsis, microbes implicated, its management and the role of pseudomonas in post-operative infections.	Lectures & tutorials	Written examinations
1.11	Describe the structure, classification, genetics, replication and pathogenesis of medically important viral families.	Lectures & tutorials	Written examinations
1.12	Describe principles of sterilization and disinfection.	Lectures & tutorials	Written examinations
1.13	Describe the action of different classes of antibiotics on different bacteria	Lectures & tutorials	Written examinations
	Define inflammation and describe its types, causes, sequence, steps, mechanisms of vascular changes, chemotaxis, coarse, features, systemic manifestations and the differences between acute and chronic inflammation.	Lectures & tutorials	Written examinations
1.14	Describe the components of the immune system, the innate and humoral immunity in health and disease.	Lectures & tutorials	Written examinations
1.15	Describe the mechanisms involved in type IV hypersensitivity and define the term macrophage activation, and list the products of activated macrophages.	Lectures & tutorials	Written examinations
1.16	Define granuloma and list the causes of granulomatous inflammation.	Lectures & tutorials	Written examinations
	Describe morphology of reversible cell injury and cell death (Necrosis), programmed cell death (apoptosis) and the differences between the various cell types (ie. labile, stable, and permanent cells) in terms of their regeneration potential with examples of each cell type and the factors that are most important in determining whether regeneration will restore normal tissue architecture and the repair by connective tissue (fibrosis).	Lectures & tutorials	Written examinations
1.17	Describe viruses causing infection in children, the Polio, Measles, Mumps and rubella.	Lectures & tutorials	Written examinations
1.18	Describe fungi causing infection such as yeast and mold infections	Lectures & tutorials	Written examinations



1.19	Describe microorganisms involved in hospital and community acquired infections and their management and prevention.	Lectures & tutorials	Written examinations
1.20	Describe communicable diseases, epidemiology and prevention.	Lectures & tutorials	Written examinations
2.0	Cognitive Skills		
2.1	Explain the principles of essential clinical investigations (SaudiMEDS-1.5)	Clinical & Practical sessions	Spotter examination
2.2	Explain tissue reactions in tuberculosis.	Clinical & Practical sessions	Spotter examination
2.3	Demonstrate a basic knowledge of the pharmacological principles of drugs relevant to clinical practice. (SaudiMEDS-1.6)	Clinical & Practical sessions	Spotter examination
2.4	Explain the pathogenesis of various diseases such as genetic, developmental, ischaemic, metabolic, toxic, infectious, autoimmune, neoplastic, degenerative, and traumatic factors, and the ways in which they affect the body. (SaudiMEDS-1.4)	Clinical & Practical sessions	Spotter examination
2.5	Explain the facts and concepts that relevant to common clinical conditions including their epidemiology, etiology, pathophysiology, symptoms and signs, complications, investigations, management and prognosis. (SaudiMEDS-1.9)	Clinical & Practical sessions	Spotter examination
3.0	Interpersonal Skills & Responsibility		
3.1			
4.0	Communication, Information Technology, Numerical		
4.1		Seminars	
5.0	Psychomotor		
5.1		Practical session	OSPE
5.2		Practical session	OSPE

Content

Topics to be covered in this block:



- 1- The bacterial classification, bacteria cell morphology, structure, and virulence.
- 2- Genetics, replication metabolism, gene exchange
- 3- Mycobacterial infection.
- 4- Mycoplasma, Rickettsia, Chlamydia and others.
- 5- The structure, classification, genetics and pathogenicity of medically important viral families
- 6- Microbial flora in the human body
- 7- Principles of sterilization and disinfection
- 8- Infection control principles in hospitals and health facilities
- 9- Specimen collection and transport for identification of infectious diseases.
- 10- Antibacterial drugs: mechanisms of action and mechanisms of resistance.
- 11- Bacteria-host interaction.
- 12- Virus-host interaction.
- 13- Fungal infection.
- 14- Emerging Infectious Diseases.
- 15- Pre and post-operative infections.
- 16- Chronic bacterial infection syndrome.
- 17- Approach patient with fever and health care associated infections
- 18- Viral infection of children.
- 19- Intrauterine Bacterial, Viral, and Parasitic Infections.
- 20- Community versus Hospital-Acquired Infections.
- 21- Communicable disease prevention and control.
- 22- Introduction and overview of the immune system.
- 23- Innate and reactive immunity.
- 24- Cell-mediated & humoral immunity.
- 25- Antigens, antibodies & the complement system.
- 26- Congenital immune deficiencies.
- 27- Acquired immune deficiencies.
- 28- Hypersensitivity & allergy.
- 29- Autoimmune conditions.

Learning strategy

The block will utilize the student-centeredness, integration and the PBL approaches to maximize correlation, learning and retention of the learned knowledge, skills and attitudes. Lectures will be of the interactive type and as few as possible. Certain materials will be studied through practical sessions and some of the important issue related to bacterial and viral infection will be learned through clinical scenarios.

Hours	Lecture	Tutorial (PBL)	Tutorial (non-PBL)	Seminars	Practical session	Other	Total
Contact	14X2	6X2		6X2	7x2		66
Credit	2			1	1		4



Type	Code	Title of activity
Lecture	L2	An Introduction To microorganisms & Structure of Bacterial Cell
Lecture 2	L2	Normal Flora on Registration body
Lecture 3	L3	An overview of the Immune System
Lecture 4	L4	The complement System
Seminar	S1	Prevalence of Common Bacterial Infections in KSA
Practical	P1	Principles of Sterilization and disinfection

Type	Code	Title of activity
Lecture 1	L5	Bacterial Metabolic requirements and Bacterial Growth
Lecture 2	L6	Bacterial Genetics: Bacterial Genome, Bacteriophage Replication
Lecture 3	L7	Bacterial Gene Exchange
Lecture 4	L8	Mechanisms of Bacterial Pathogenesis and Infections
Seminar	S2	Nosocomial Infections and Infection Control
Practical	P2	Culture media/Quantification of Microorganisms Pure Culture Technique

**Week Four: 9/10/2016 - 13/10/2016**

Type	Code	Title of activity
Lecture 1	L9	Mechanisms of Bacterial Pathogenesis and Infections (2)
Lecture 2	L10	The Immune response to Bacterial Infection (1)
Lecture 3	L11	The Immune response to Bacterial Infection (2)
Lecture 4	L12	Diagnosis of Bacterial Infection
PBL	case1	
Practical	P3	Antibiotic Sensitivity Testing (MIC & MBC) & Serum Bactericidal Activity / Mechanisms of Antibiotic Action and Antibiotic Resistance/ Physiological Reactions

Week Five: 16/10/2016 - 20/10/2016

Type	Code	Title of activity
Lecture 1	L13	Gram Positive Cocci & Gram Negative Cocci
Lecture 2	L14	Gram Positive Rods & Gram Negative Rods & Mycobacteria
Lecture 3	L15	An Introduction to Fungi
Lecture 4	L16	The Immune response to pathogenic Fungi
Exam		Mid Block
Practical	P4	Gram staining / Spore staining / Acid Fast Staining

Week Six: 23/10/2016 - 27/10/2016

Type	Code	Title of activity
Lecture 1	L17	The Classification and Structure of Viruses
Lecture 2	L18	Mode of Viral infection and pathogenesis
Lecture 3	L19	Viral Diseases
Lecture 4	L20	The immune response to viral infection (1)



PBL	Case 2	
Lecture 5	L21	The immune response to viral infection (2)

Week Seven: 30/10/2016 - 3/11/2016

Type	Code	Title of activity
Lecture 1	L22	Parasites and mode of parasitic infection
Lecture 2	L23	Parasites and immune response
Lecture 3	L24	Cell Mediated Immunity
Lecture 4	L25	Humoral Immunity
Practical	P5	Fungal Diseases and Diagnosis and Pathology of Parasitic Infection

Week Eight: 6/11/2016 - 10/11/2016

Type	Code	Title of activity
Lecture 1	L26	Inflammation as an Immune Response
Lecture 2	L27	Regulation of the Immune System
Lecture 3	L28	Immunization and Immunity
Lecture 4	L29	Immunodeficiency Disorders 1
PBL	case3	
Practical	P6	Immunology: antibody / antigen Reaction

Week Nine: 13/11/2016 – 19/11/2016: Mid Semester Vacation

Week Ten: 20/11/2016 - 24/11/2016

Type	Code	Title of activity



Lecture 1	L30	Immunodeficiency Disorders 1
Lecture 2	L31	Hypersensitivity and Allergy
Lecture 3	L32	Autoimmune Disorders 1
Lecture 4	L33	Autoimmune Disorders 2
Seminar	S3 /S4	Bacterial Infection / Viral Infection Parasitic Infection / Autoimmune
PBL	Case3 Discussion	

Week Eleven: 27/11/2016 - 1/12/2016 Final Examination

Assessment strategy

Assessment of students will employ a battery of assessment tools that are fit-for-purpose and reliable. Knowledge will be assessed through MCQ-type written exam and computer-based spotter exam. These will be conducted at the middle of the block & at its end. In addition to the mid-block written exam, continuous assessment will be done through the evaluation of performance in PBL sessions and through assignments.

Assessment of students regarding the seminar will be topic by every two students and Quiz on seminar topics for all the students are attending the course.

Schedule of assessment tasks for students during the course			
	Assessment task	Week Due	% of Total Assessment
1	Seminar evaluation and quiz	All weeks	20
2	Midterm Exam	Week 5	20
3	Spotter exam	Week 8	20
4	Final Written Exam	Week 9	40

Recommended reading

- 1- Sherris Medical Microbiology. sixth ed 2014 by Kenneth J. Ryan and C. George Ray
- 2- Review of medical microbiology and Immunology twelfth ed by Warren Levinson 2012
- 3- Mims' Medical Microbiology fifth ed 2012 by Richard Goering, Hazel Dockrell, Mark Zuckerman, Ivan M. Roitt, and Peter L. Chiodini
- 4- Medical Microbiology, 67th Edition By Patrick R. Murray, Ken S. Rosenthal, and Michael A. Pfaller, 2012



- 5- Medical Microbiology. A guide to microbial infection: pathogenesis, immunity, laboratory investigation and control. Eighteenth ed David G.M. Barer and Richard S. W. Irving 2012
 - 6- Medical Microbiology by Fritz H. Kayser 2005
 - 7- Richard Hunt et al. Microbiology and Immunology On-line 2011
 - 8- Essentials of Medical Microbiology fourth edition by Rajesh Bhatia and [Rattan LalIchhpujani](#) 2008
 - 9- Practical Medical Microbiology fourteenth by Mackie & McCartney 2012
 - 10- Diagnostic Microbiology twelfth ed Betty A Forbes and Daniel F Sahn 2007
 - 11- Medical Microbiology & Immunology Warren Levinson McGraw Hill Professional, 2004
 - 12- Medical Microbiology, 4th edition Edited by Samuel Baron. 1996
 - 13- Laboratory Exercises in Microbiology, Ninth Edition Harley–Prescott 2013
- Recommended electronic resources**

- <https://books.google.com.sa/books?isbn=1588902455>
- <http://www.microbiologybook.org/>