Textbooks–

Warren Levinson et al. Review of Medical Microbiology and Immunology. 15th edition

Lippincott's Illustrated Reviews: Microbiology Third Edition

Faculty of Physical Medicine and Rehabilitation

Thematic Plan of Lectures and Practical Classes

Study Weeks	Lectures	Duration (hours)
1.	Introduction of study course. Bacteria Compared with other microorganisms. Structure of bacterial cells.	1h.
2.	Genetics of bacteria. Growtg of bacteria. Basic virology - structure, replication of viruses. Antiviral drugs – classification, mode of action. Bacteriophages.	1h.
3.	Human normal microflora – members of normal flora, anatomic location. Sterilization and disinfection.	1h.
4.	Antimicrobial drugs: principles of antibiotic therapy, bactericidal and bacteriostatic activity, mechanism of action:inhibition of cell wall synthesis, inhibition of protein synthesis, inhibition of nucleic acid synthesis	1h.
5.	Alteration of Fungal Cell Membranes, antifungal drugs. Additional drug mechanisms. antibacterial activity., chemoprophylaxis, probiotics. Antimicrobial Drugs: antibiotic resistance.	1h.
6.	Pathogenesis of bacterial infections. Types of bacterial infection. Invasion and inflammation.	1h.
7.	Mechanisms of toxin production. Exotoxins and endotoxins, their comparative description and modes of action. Stages of Infectious infections.	1h.
8.	Bacterial Vaccines. Active immunity. Passive immunity	1h.
9.	Laboratory Diagnosis of infectious diseases bacteriologic and immunologic methods.	1h.
10.	Clinical Microbiology.	1h.

N	**Content of practical classes and seminars** (15 classes, each of 3h.)	**Study materials**
1.	Introduction of safety rules in microbiology laboratory; Classification of major microbial groups causing infectious diseases in humans • Discuss important features of microbes • Define eukaryotes and prokaryotes • Classify bacteria according to their shape and size	**Levinson's** chapters 1,2

	• Describe the structure of Bacteria (cell wall, cytoplasmic membrane, cytoplasm, etc.) • Define structures outside the cell wall (capsule, flagella, pili, glycocalyx and etc.) *Laboratory Session - Gram Stain technique*	
2.	• Discuss the **growth cycle** • Describe the aerobic and anaerobic growth • importance of sugar fermentation, and iron metabolism. • Discuss **bacterial genetics**: types of mutations and their importance. Transposons and transfer of DNA within Bacterial cells, Programmed rearrangements • Transfer of DNA between Bacterial cells; conjugation, transduction and transformation • Explain recombination: homologous and nonhomologous *Laboratory Session - cultivation technique*	**Levinson's** Chapters 3,4
3.	• General Virology. Viral structure and replication cycle. Bacteriophages – structure, replication, and lysogenic conversion • Antiviral drugs – classification, mode of action.	**Levinson's** Chapters 28,29 - only "Pearls"; and Chapter 35
4.	• Microflora of the human body. • Principles of sterilization and disinfection, and their clinical importance.	**Levinson's** Chapters 6,13
5	• Antimicrobial drugs: principles of antibiotic therapy, bactericidal and bacteriostatic activity, mechanism of action: inhibition of cell wall synthesis, inhibition of protein synthesis, inhibition of nucleic acid synthesis, alteration of cell membrane function. • *Laboratory Session about defining antibiotic sensitivity: disc diffusion (Kirby-Bauer method) and its interpretation*	**Levinson's** Chapter 10 (part 1)
6.	• Additional drug mechanisms. antibacterial activity. Alteration of Fungal Cell Membranes, chemoprophylaxis, probiotics. • Antimicrobial Drugs: antibiotic resistance.	**Levinson's** Chapters 10 (part 2),11
7.	**Midterm 1**	
8.	Pathogenesis of bacterial infections. Types of bacterial infection. Invasion and inflammation. • Explain why do people get infectious diseases. • Discuss types of bacterial infections, transmission, portals of entry of some common pathogens, • Describe stages of an infectious disease • Define principles of pathogenesis (opportunistic pathogens, virulence) • types of bacterial infections • mechanisms of toxin production, invasion and inflammation, and intracellular survival.	**Levinson's** Chapter 7 (part 1)
9.	• Explain endotoxins and exotoxins, their characteristics and their mode of	**Levinson's**

	action. • Exotoxins of Gram-positive bacteria, • Exotoxins and endotoxins of Gram-negative bacteria (septic shock, hemolytic-uremic syndrome, fever, disseminated intravascular coagulation - DIC, systemic inflammatory response syndrome - SIRS) endothelium damage, cytokines - IL, TNF involvement).	Chapter 7 (part 2)
10.	• Bacterial vaccines - capsular polysaccharide vaccines, toxoid vaccines, purified protein vaccines, live (attenuated) bacterial vaccines, and Killed vaccines. Active and passive immunity.	**Levinson's** Chapter 12
11.	• Laboratory Diagnosis – bacteriologic and immunologic methods. Bacterial cultivation. • Describe commonly used bacteriologic agars and their functions • Describe bacteriologic methods of blood, throat, sputum, CSF, stool, genital tract, wound abscess cultures) • Discuss immunologic methods; capsular swelling (quelling) reaction, slide agglutination test, latex agglutination test, counter immunoelectrophoretic test, enzyme-linked immunosorbent assay, and fluorescent antibody tests. Identify serum antibodies with known antigens (slide or tube agglutination test);	**Levinson's** Chapter 9
12.	• Etiological agents of sexually transmitted diseases • Etiological agents of food poisoning • Etiological agents of urinary tract infections	**Lippincott's** Chapter 33 (367-375p.)
13.	• Etiological agents of bacterial meningitis • Etiological agents of hepatitis • Community-acquired pneumonia, atypical pneumonia	**Lippincott's** Chapter 33 (376-383p.)
14.	• Bone & Joint Infections. Skin and soft tissue infections - impetigo, cellulitis/erysipelas, folliculitis, skin abscess (furuncle and carbuncle), necrotizing soft tissue infections (necrotizing fasciitis/ myonecrosis. • Opportunistic infections of HIV • Infectious diseases of aye. Bacterial sinusitis, acute otitis media.	**Levinson's** Chapters 70, 77 **Lippincott's** Chapter 33 (384-391p.)
15.	**Midterm 2**	