InthenameofGod

Hamadan University of Medical Sciences and Health Services

Educational Deputy of the University

Center for Studies and Development of Medical Sciences Education

Theory/Practical Lesson Plan Form

Dear Colleagues,

As the teaching-learning process is one that requires careful planning to achieve its objectives, it is essential to develop a lesson plan at the beginning of the educational process. This plan serves as a map and guide for both instructors and students, making it one of the primary tools for educational activities.

Therefore, we kindly ask all instructors to exercise utmost care in completing the lesson plan.

- **Course Title**: Medical Bacteriology
- **Instructors**:
  - Dr. Mohammad Youssef Alikhani
  - Dr. Rasool Yousofi Mashhoof
  - Dr. Mohammad Reza Arabestani
- **Course Coordinator**: Dr. Mohammad Youssef Alikhani
- **Department Head**: Dr. Mohammad Youssef Alikhani

- **Credit Hours**:
  - **Theoretical**: 2.4 units
  - **Practical**: 0.6 units
- **Student Major and Level**: Medicine - General Doctorate
- **Course Timing**: First Semester
- **Teaching Location**: Medical School / Classroom No. 5

باکتری شناسی پزشکی (نظری)

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
1	History, Classification, and Basics of Microbiology	1. Explain the science of microbiology 2. Name the discoverers of the	Cognitive - Understanding Cognitive - Knowledge	Lecture and Group Discussion Film Screening	120 minutes	PowerPoint and Projector	Question and Answer

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		microbial world 3. List the activities of Louis Pasteur 4. Describe Joseph Lister's role in surgical disinfection 5. Enumerate the reasons for the need for disinfection in the operating room 6. Draw the classification algorithm of microorganisms 7. Distinguish prokaryotic cells from eukaryotic cells by illustration 8. Show the importance of microbiology in medicine through questions and	Cognitive - Knowledge Cognitive - Understanding Cognitive - Analysis Cognitive - Application Cognitive - Application Affective - Valuing				

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		develop belief in it					
2	Structural Anatomy of Bacteria (Main and Accessory Appendages)	1. Name the main appendages of bacterial structure 2. Name the accessory appendages of bacteria 3. Draw the shape of bacteria 4. Distinguish the cell wall of Gram-positive bacteria from Gram-negative	Cognitive - Knowledge Cognitive - Knowledge Cognitive - Application Cognitive - Application Cognitive - Analysis Cognitive - Understanding Cognitive - Application Cognitive - Knowledge	Lecture and Group Discussion Film and Multimedia Presentation	120 minutes	PowerPoint and Projector	Question and Answer and Student Seminar
3	Metabolism, Growth, and Reproduction of Bacteria	1. Explain bacterial metabolism 2. Draw the bacterial growth curve 3. Describe	Cognitive - Understanding Cognitive - Application Cognitive - Understandin	Lecture, Group Discussion	120 minutes	PowerPoint, Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		physical and chemical factors affecting bacterial growth 4. Explain methods of bacterial reproduction 5. Describe methods of energy production in bacteria 6. Calculate the division time of bacteria during logarithmic growth	g Cognitive - Understanding Cognitive - Understanding Cognitive - Application				
4	Genetics of Microorganisms	1. Define genotypic changes in bacteria 2. Define mutation 3. List types of mutations in bacteria 4. Explain the	Cognitive - Knowledge Cognitive - Knowledge Cognitive - Knowledge Cognitive - Understanding Cognitive -	Lecture, Group Discussion	120 minutes	PowerPoint, Articles	Question and Answer

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		process of mutation in bacteria 5. Explain genetic exchanges in bacteria 6. Name types of genetic exchanges in bacteria 7. Explain conjugation in bacteria 8. List stages of transformation in bacteria 9. Explain transduction in bacteria 10. Explain drug resistance in bacteria	Understanding Cognitive - Knowledge Cognitive - Understanding Cognitive - Knowledge Cognitive - Understanding Cognitive - Understanding				
5	Pathogenicity, Microbial Flora of the Body, and Epidemiology of	1. Explain the mechanisms of bacterial pathogenicity 2. Name the	Cognitive - Understanding Cognitive - Knowledge	Lecture, Group Discussion	120 minutes	PowerPoint, Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
	Pathogenic Bacteria	microbial flora of various body organs 3. Explain the epidemiology of pathogenic bacteria 4. Analyze the relationship between bacterial endotoxin and symptoms like fever, chills, and shock	Cognitive - Understanding Cognitive - Analysis				
6	Antimicrobial Agents (Antibiotics)	1. Explain the properties of antibiotics 2. Name the mechanisms of antibiotics affecting bacterial cells 3. Name competitive antibiotics 4. Explain the side effects of	Cognitive - Understanding Cognitive - Knowledge Cognitive - Knowledge Cognitive - Understanding Cognitive - Knowledge Cognitive -	Lecture and Group Discussion Film Screening	120 minutes	PowerPoint and Projector	Question and Answer and Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		antibiotics 5. Name antibiotics affecting protein synthesis in bacteria 6. Name antibiotics affecting the nucleus of bacteria 7. Analyze the causes of increased drug resistance in bacteria in society 8. Demonstrate how to perform an antibiogram 9. Collaboratively show the importance of performing antibiograms in treating infectious diseases	Knowledge Cognitive - Analysis Psychomotor Affective - Valuing				

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
7	Disinfectants (Physical and Chemical Agents)	1. Explain the principles of sterilization 2. Calculate the temperature required for sterilization in an autoclave 3. Explain the principles of working with a furnace 4. Explain the mechanism of the water bath 5. Describe how to work with an incubator 6. Explain working with UV light 7. Name common disinfectants 8. Draw a flowchart of the disinfection process levels	Cognitive - Knowledge Cognitive - Application Cognitive - Understanding Cognitive - Understanding Cognitive - Understanding Cognitive - Understanding Cognitive - Knowledge Cognitive - Analysis Cognitive - Understanding	Lecture and Group Discussion Film Screening	120 minutes	PowerPoint and Projector	Question and Answer and Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		9. Explain the importance of disinfection in preventing infectious diseases					
8	Gram-Positive Cocci (Staphylococcus and Micrococcus)	1. Explain the general characteristics of staphylococci and their types 2. Name factors affecting the pathogenicity of this bacterium 3. Name the toxins and exoenzymes secreted by this bacterium 4. Describe the diseases and clinical findings caused by this bacterium 5. Explain the epidemiology and	Cognitive - Understanding Cognitive - Knowledge Cognitive - Knowledge Cognitive - Understanding Cognitive - Understanding Cognitive - Analysis Cognitive - Understanding Cognitive - Application	Lecture and Group Discussion	120 minutes	PowerPoint and Projector	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		transmission of this bacterium in society 6. Illustrate methods of bacterial sampling 7. Explain treatment and effective antibiotics for this bacterium 8. Describe methods of preventing diseases caused by this bacterium 9. Distinguish this bacterium's morphology from other bacteria					
9	Gram-Positive Cocci (Streptococci and Enterococci)	1. Explain the general characteristics of streptococci and their types 2. Name factors affecting the	Cognitive - Understanding Cognitive - Knowledge Cognitive - Knowledge	Lecture and Group Discussion	120 minutes	PowerPoint and Projector	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		pathogenicity of this bacterium 3. Name the toxins and exoenzymes secreted by this bacterium 4. Describe the diseases and clinical findings caused by this bacterium 5. Explain the epidemiology and transmission of this bacterium in society 6. Illustrate methods of bacterial sampling 7. Explain treatment and effective antibiotics for this bacterium 8. Describe methods of	Cognitive - Understanding Cognitive - Understanding Cognitive - Analysis Cognitive - Understanding Cognitive - Understanding				

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		preventing diseases caused by this bacterium 9. Explain the general characteristics of enterococci and their types					
10	Gram-Negative Cocci (Neisseriaceae)	1. Explain the general characteristics of Neisseria 2. List important pathogenic types of this family 3. Name factors affecting the pathogenicity of Neisseria 4. Name important antigens of Neisseria 5. Name the toxins and exoenzymes secreted by this	Cognitive - Understanding Cognitive - Knowledge Cognitive - Knowledge Cognitive - Knowledge Cognitive - Knowledge Cognitive - Understanding Cognitive - Understanding Cognitive - Understandin	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		bacterium 6. Explain the structural characteristics of Neisseria 7. Explain the physiological characteristics of Neisseria 8. Describe the diseases and findings caused by Neisseria 9. Explain the pathogenic mechanisms of Neisseria 10. Explain the epidemiology and transmission of Neisseria in society 11. Illustrate methods of bacterial sampling and identification of Neisseria	g Cognitive - Understanding Cognitive - Analysis Cognitive - Understanding				

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		12. Explain treatment and prevention methods for diseases caused by Neisseria					
11	Enterobacteriaceae (Lactose Positive)	1. Explain the characteristics of the Enterobacteriaceae family 2. Classify and compare members of the Enterobacteriaceae family 3. Explain the epidemiology of lactose-positive bacteria 4. Explain the virulence factors of lactose-positive bacteria 5. Illustrate methods of bacterial sampling	Cognitive - Understanding Cognitive - Synthesis Cognitive - Understanding Cognitive - Understanding Cognitive - Analysis Cognitive - Application Cognitive - Understanding	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		6. Distinguish the morphology of these bacteria from similar bacteria 7. Explain identification, prevention, and treatment methods for lactose-positive bacteria					
12	Midterm Exam (35 points out of 100)	Testing Center	Faculty Group				
13	Enterobacteriaceae (Lactose Negative)	1. Explain the epidemiology of lactose-negative bacteria 2. Describe how these bacteria grow and reproduce in culture media 3. Distinguish the morphology of	Cognitive - Understanding Cognitive - Understanding Cognitive - Application Cognitive - Knowledge Cognitive -	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		these bacteria from similar bacteria 4. Name the virulence factors of lactose-negative bacteria 5. Explain identification, prevention, and treatment methods for lactose-negative bacteria	Understanding				
14	Clostridia	1. Explain the general characteristics of Clostridia 2. List the important pathogenic types of this family 3. Name factors affecting the pathogenicity of Clostridia 4. Name	Cognitive - Understanding Cognitive - Knowledge Cognitive - Knowledge Cognitive - Knowledge Cognitive - Knowledge Cognitive - Understandin	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		important antigens of Clostridia 5. Name the exotoxins secreted by Clostridia 6. Explain the structural characteristics of Clostridia 7. Explain the physiological characteristics of Clostridia 8. Describe the diseases and findings caused by Clostridia 9. Explain the pathogenic mechanisms of Clostridia 10. Explain the epidemiology and transmission of Clostridia in	g Cognitive - Understanding Cognitive - Understanding Cognitive - Understanding Cognitive - Analysis Cognitive - Understanding				

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		society 11. Illustrate methods of bacterial sampling and identification of Clostridia					
15	Vibrionaceae, Campylobacter, and Helicobacter	1. Explain the characteristics of the genera Vibrio, Campylobacter, and Helicobacter 2. Compare and classify members of these genera 3. Explain the epidemiology of members of these genera 4. Name the virulence factors of members of these genera 5. Distinguish the morphology of these bacteria from similar bacteria	Cognitive - Understanding Cognitive - Synthesis Cognitive - Understanding Cognitive - Knowledge Cognitive - Application Cognitive - Understanding	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		6. Explain identification, prevention, and treatment methods for members of these genera					
16	Mycobacterium tuberculosis, Mycobacterium (leprae), and Legionella	1. Explain the general characteristics of mycobacteria 2. List important types of mycobacteria 3. Illustrate the shape and structure of mycobacteria 4. Name factors affecting the pathogenicity of mycobacteria 5. Explain the antigenic properties of mycobacteria 6. Explain the	Cognitive - Understanding Cognitive - Knowledge Cognitive - Application Cognitive - Knowledge Cognitive - Understanding Cognitive - Understanding Cognitive - Understanding Cognitive - Understandin	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		physiological characteristics of mycobacteria 7. Describe the pathogenic mechanisms of mycobacteria 8. Explain the epidemiology and transmission of mycobacteria in society 9. Illustrate methods of bacterial sampling and identification of mycobacteria 10. Explain treatment and prevention methods for diseases caused by mycobacteria	g Cognitive - Analysis Cognitive - Understanding				
17	Corynebacterium, Listeria, and Bacillus	1. Explain the characteristics of the genera Corynebacterium,	Cognitive - Understanding Cognitive -	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer,

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		Listeria, and Bacillus 2. Classify and compare members of these genera 3. Explain the epidemiology of members of these genera 4. Name the virulence factors of members of these genera 5. Distinguish the morphology of these bacteria from similar bacteria 6. Explain identification, prevention, and treatment methods for members of these genera	Application Cognitive - Understanding Cognitive - Knowledge Cognitive - Application Cognitive - Understanding				Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
18	Spirochetes (Treponema, Borrelia, and Leptospira)	1. Explain the general characteristics of spirochetes 2. List important types of spirochetes 3. Illustrate the shape and structure of spirochetes 4. Name factors affecting the pathogenicity of spirochetes 5. Explain the antigenic properties of spirochetes 6. Explain the physiological characteristics of spirochetes 7. Describe the pathogenic mechanisms of spirochetes	Cognitive - Understanding Cognitive - Knowledge Cognitive - Application Cognitive - Knowledge Cognitive - Knowledge Cognitive - Knowledge Cognitive - Understanding Cognitive - Understanding Cognitive - Analysis Cognitive - Understanding	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		8. Explain the epidemiology and transmission of spirochetes in society 9. Illustrate methods of bacterial sampling and identification of spirochetes 10. Explain treatment and prevention methods for diseases caused by spirochetes					
19	Brucella, Haemophilus, and Bordetella	1. Explain the characteristics of the genera Brucella, Haemophilus, and Bordetella 2. Compare and classify members of these genera 3. Explain the epidemiology of	Cognitive - Understanding Cognitive - Synthesis Cognitive - Understanding Cognitive - Knowledge Cognitive -	Lecture and Group Discussion	120 minutes	PowerPoint and Articles	Question and Answer, Student Seminar

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		members of these genera 4. Name the virulence factors of members of these genera 5. Distinguish the morphology of these bacteria from similar bacteria 6. Explain identification, prevention, and treatment methods for members of these genera	Application Cognitive - Understanding				
20	Mycoplasma, Rickettsia, and Chlamydia	1. Explain the general characteristics of Mycoplasma, Rickettsia, and Chlamydia 2. List important types of Mycoplasma,					

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		Rickettsia, and Chlamydia 3. Illustrate the shape and structure of Mycoplasma, Rickettsia, and Chlamydia 4. Name factors affecting the pathogenicity of Mycoplasma, Rickettsia, and Chlamydia 5. Explain the antigenic properties of Mycoplasma, Rickettsia, and Chlamydia 6. Explain the physiological characteristics of Mycoplasma, Rickettsia, and Chlamydia 7. Describe the					

Session	Topic	Learning Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		pathogenic mechanisms of Mycoplasma, Rickettsia, and Chlamydia 8. Explain the epidemiology and transmission of					

Evaluation Methods

Type of Evaluation	Date	Evaluation Tool	Points out of Total
Quiz		Class Q&A	1 point
Project Presentation		Student Seminar Presentation	1 point
Midterm Exam		Answering multiple-choice test questions	6 points
Final Exam		Answering multiple-choice test questions	12 points
Other		-	-
Total			**20 points**

Medical Bacteriology (Practical) Program

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
1	Introduction to the Laboratory and Sterilization	1. Name basic laboratory equipment. 2. Name specific bacteriology lab equipment. 3. Describe loop and swab use. 4. Explain automatic pipette use. 5. Identify specialized equipment for culture. 6. Describe safety principles in bacteriology lab. 7. Explain sterilization and	Cognitive-Knowledge, Cognitive-Comprehension, Psychomotor	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations, video presentation	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		disinfection principles. 8. Operate and set up autoclave. 9. Operate and set up oven. 10. Operate and set up UV light. 11. Operate and set up water bath. 12. Operate and set up laboratory hood.					
2	Culture Media Preparation and Proper Culturing Methods	1. Name necessary lab items for culturing. 2. Name types of bacterial culture	Cognitive-Knowledge, Cognitive-Comprehension, Psychomotor	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations, video presentation	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		media. 3. Describe bacterial culturing methods. 4. Demonstrate preparation of various culture media. 5. Set up and adjust incubator. 6. Adhere to disinfection principles during culturing. 7. Explain proper bacterial culturing methods. 8. Correctly					

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		culture patient samples on suitable media.					
3	Gram Staining	1. Explain the mechanism of bacterial staining. 2. Describe classification based on staining. 3. Name materials required for staining. 4. Prepare a slide. 5. Illustrate steps of bacterial staining. 6. Demonstrate	Cognitive-Comprehension, Psychomotor	Demonstration by Instructor	4 hours	PowerPoint, animations	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		microscope use. 7. Identify stained slides using a properly adjusted microscope.					
4	Microbial Sensitivity Testing (Antibiogram)	1. Name equipment for microbial sensitivity testing. 2. Identify suitable culture media for sensitivity testing. 3. Describe methods for microbial sensitivity testing. 4. Demonstrat	Cognitive-Knowledge, Cognitive-Comprehension, Psychomotor	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations, video presentation	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		e preparation of microbial samples for testing. 5. Count bacteria using McFarland solution. 6. Correctly place antibiotic disks on culture media. 7. Interpret and report sensitivity test results accurately.					
5	Identification of Staphylococcus and Neisseria	1. Perform appropriate staining for microscopy. 2. Prepare relevant	Psychomotor, Cognitive-Application	Demonstration by Instructor	4 hours	PowerPoint, animations	Active class participation, written test, observation,

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured bacteria. 5. Distinguish cultured bacteria. 6. Conduct relevant biochemical tests. 7. Identify relevant bacteria using suitable tests.					imitation (checklist)
6	Identification of Streptococcus	1. Perform appropriate staining for	Psychomotor, Cognitive-Application	Lecture, Demonstratio	4 hours	PowerPoint, animations, video	Active class participation, written

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
	and Pneumococcus	microscopy. 2. Prepare relevant culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured bacteria. 5. Distinguish cultured bacteria. 6. Conduct relevant biochemical tests. 7. Identify relevant bacteria using suitable tests.		n by Instructor		presentation	test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
7	Enterobacteriaceae (Lactose Positive and Negative)	1. Perform appropriate staining for microscopy. 2. Prepare relevant culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured bacteria. 5. Distinguish cultured bacteria. 6. Conduct relevant biochemical tests. 7. Identify relevant bacteria	Psychomotor, Cognitive-Application	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		using suitable tests.					
8	Pseudomonas, Vibrio, and Brucella	1. Perform appropriate staining for microscopy. 2. Prepare relevant culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured bacteria. 5. Distinguish cultured bacteria. 6. Conduct relevant biochemical tests.	Psychomotor, Cognitive-Application	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		7. Identify relevant bacteria using suitable tests.					
9	Corynebacterium and Bacillus	1. Perform appropriate staining for microscopy. 2. Prepare relevant culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured bacteria. 5. Distinguish cultured bacteria. 6. Conduct	Psychomotor, Cognitive-Application	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations, video presentation	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		relevant biochemical tests. 7. Identify relevant bacteria using suitable tests.					
10	Identification of Clostridium Group	1. Perform appropriate staining for microscopy. 2. Prepare relevant culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured bacteria. 5. Distinguish	Psychomotor, Cognitive-Application	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		cultured bacteria. 6. Conduct relevant biochemical tests. 7. Identify relevant bacteria using suitable tests.					
11	Identification of Mycobacterium and Spirochetes	1. Perform appropriate staining for microscopy. 2. Prepare relevant culture media. 3. Execute suitable culturing methods. 4. Conduct incubation of cultured	Psychomotor, Cognitive-Application, Cognitive-Comprehension	Lecture, Demonstration by Instructor	4 hours	PowerPoint, animations	Active class participation, written test, observation, imitation (checklist)

Session	Topic	Behavioral Objectives	Learning Domain	Teaching Method	Duration	Teaching Aids	Evaluation Method
		bacteria. 5. Distinguish cultured bacteria. 6. Conduct relevant biochemical tests. 7. Identify relevant bacteria using suitable tests. 8. Explain the steps of the tuberculin test.					
Final Exam	Medical School – Microbiology Laboratory	Group of Instructors					MCQ and Short Answer Test, Observation (checklist)

Type of Evaluation	Date	Evaluation Tool	Total Points
Class Activity		Level of participation in class discussions	2 points
Attendance		Active presence in the laboratory and participation in experiments	2 points
Written Test		Multiple choice and short answer	6 points
Final Exam		Station-based final exam (OSCE) and practical demonstration (observation, imitation, checklist)	10 points

1. Medical Microbiology; PATRICK R. MURRAY; last Edition
2. Medical Microbiology; Jawetz, Melnick, & Adelberg's; last Edition

1. Text book of Diagnostic Microbiology; Mahon CR; Elsevier, 2020

2. Diagnostic Microbiology (Isolation and Identification of Pathogenic Microorganisms)
Authors:
Dr. Mohammad Youssef Ali Khani, Dr. Mohammad Reza Arabestani, Dr. Abbas Bahador, Reza Kamali, Seyyed Masoud Mousavi