



Department of Biology

College of Science

Salahaddin University-Erbil

Subject: Medical Bacteriology Theory

Course Book – (Year 4)

Lecturer's name:

Asst.Prof. Daristan Jamal Ghareeb

Asst.Prof. Dr.Akhter Ahmed Ahmed

Asst. Lecturer Shahnaz Burhan Ali

Academic Year: 2022/2023- First Semester

Course Book

1. Course name	Medical Bacteriology
2. Lecturer in charge	Daristan Jamal Ghareeb & Akhter A Ahmed
3. Department/ College	Biology /Science
4. Contact	e-mail: daristan.ghareeb@su.edu.krd akhter.ahmed@su.edu.krd Tel: 07507929164
5. Time (in hours) per week	Theory:2 Practical:6
6. Office hours	<u>To be Return to the schedule on the office door</u>
7. Course code	SBIO 402
8. Teacher's academic profile	<p>Asst.Prof. Daristan Jamal Ghareeb B.Sc in Biology, Salahaddin University, 1988. M.Sc in Microbiology, Salahaddin University, 1994. Assistant Professor of Medical Microbiology at the Department of Biology, College of Science, University of Salahaddin University. Member of Kurdistan Biological Syndicate. -More than 25 years of experience in teaching and research in basic and Medical Bacteriology.</p> <p>Asst.Prof. Dr. Akhter Ahmed Ahmed B.Sc. in Microbiology, University of Salahaddin, College of Sciences,1995 . M.Sc. in Microbiology, University of Salahaddin, College of Sciences, 2000. Ph.D in Medical Bacteriology, University of Salahaddin, College of Science 2019.</p>
9. Keywords	Microbiology, Medical Microbiology, Bacteriology, Pathogenesis, Bacterial Toxins, Bacterial Physiology.
10. Course overview:	This course is one of the fundamental courses in biology which covers all microbiological agents that are responsible for human diseases especially the bacterial agents. The students should learn how to diagnose and analyze different specimens taken from different systems

of the human body and isolate the agents responsible for such diseases. Both theoretical and practical laboratory sessions will help the students gain the required skills to work in the public and private clinics and diagnostics laboratories.

11. Course objective:

This course aims to teach general principles of bacterial pathogenesis and the mechanisms of disease production through the array of virulence factors and toxins possessed by the pathogenic bacteria. Also it includes the study of the mechanisms of actions of different antimicrobial agents and how to combat these agents.

12. Student's obligation

Exam policy:

Students should take 2 exams throughout the course.

Classroom rules:

1-Students must arrive to class on time and to stay for the entire class period (or until dismissed) because random arrivals and exits are disrespectful and distracting.

2-Talking and other disruptive behaviors are not permitted while classes are in session

3-Entering the class room after the instructor's presentation has started can be distracting both to the instructor as well as to other students, especially if the person arriving late walks across the length of the class room between the instructor and the assembled students. Those who come late should seat themselves as close to the entrance as possible and avoid any sort of disruption.

4-All cell phones, smartphones, and other electronic devices (e.g., pagers, iPads) must be turned off (or on vibrate) and hidden from view during class time.

5-During class please refrain from side conversations. These can be disruptive to your fellow students and your professor.

13. Forms of teaching ; Course Book and PowerPoint

14. Assessment scheme

Component	Date	Percent
Paper based exams		13%
Quizzes and all year attendance		2%

Practical Exam	35%
Final Exam	50%

15. Student learning outcome: After completion of this course, you will be able to:

Learning different terms and definitions in Medical Microbiology.
 Diagnosing different Microbiological agents from specimens.
 Learning the shape and structure of different bacteria.
 Learning the process of disease production by bacteria.
 Learning the structure and mechanisms of different bacterial toxins.
 Learning the mode of action of different antibiotics.
 Learning the pathology of disease production by different bacterial toxins and enzymes.

16. Course Reading List and References:

▪ **Key references:**

-Stefan Riedel, Stephen A. Morse, Timothy A. Mietzner, Steve Miller (2019).
 Jawetz, Melnick, & Adelberg's Medical Microbiology, 28th Edition .

-Warren E. Levinson. (2014). Review of Medical Microbiology & Immunology
 14th Edition by The McGraw-Hill Companies.

✦ **Useful references:**

- Essential Microbiology. Stuart Hogg,. John Wiley & Sons Ltd.
- Sherris Medical Microbiology, An Introduction To Infectious Disease. James J. Champoux , Frederick C. Neidhardt, W. Lawrence Drew, James J. Plorde, Kenneth J. Rya N, C. George Ray. Mcgraw-Hill.
- Medical Microbiology. Cedric Mims, Hazel Dockrell, Richard Goering, Ivan Roitt, Derek Wakelin, & Mark Zuckerman.

17. The Topics:

Week 1	Introduction to Microbiology + Course book
Week 2	Pathogenesis of Bacterial Infections

Week 3	Human Normal Microbiota
Week 3 and 4	Spore forming gram positive bacilli: Bacillus species Clostridium Species
Week 5	Non-spore forming gram positive bacilli: Corynebacterium, Listeria
Week 6 and 7	Antimicrobial Chemotherapy
Week 8	Exam
Week 9	The Staphylococci
Week 10-11	The Streptococci, Enterococci and related genera
Week 12	The Neisseriae
Week13-14	Enteric Gram-negative Rods (Enterobacteriaceae)

18.Examinations

Examination samples

1-Answer the following questions

Question: Explain the reason behind SSSS ?

Answer: It is an exfoliated toxin produces by *S. aureus*.

Question: What are the differences between an extotoxin and an endotoxin ?

Answer: Extotoxin is secreted to the outside of the cell, whereas endotoxin is part of the cell wall of bacteria

2-State the role of the followings in the bacterial pathogenesis:

-Hyaluronidase

-Answer: degrades hyaluronic acid, which is the ground substance of subcutaneous tissue.

3-Write the scientific explanation behind the following statements:

Question:There are few antimicrobials that act on the cell membrane of the bacteria.

Answer: -Because the structural and chemical similarities of bacterial and human cell membranes make it difficult to provide sufficient selective toxicity.

First Semester Coursebook

Course Title		Practical Medical Bacteriology
Code	Theory Hr./week	Practical Hr./week
SBIO 402	2	6

Course type	Compulsory
Department/College	Biology/Science
Course language	English

Course lecturer	Shahnaz Burhan Ali (BSc. MSc.)
Contact	Shahnaz.ali@su.edu.krd Tel; (+964 750 4762812)
Teacher's academic Profile	<p>Shahnaz B. Ali</p> <p>I graduated from <u>Salahaddin</u> University in (2005) working as an assistant biologist for three years in various Labs. A member of the Biological syndicate in 2006. In 2011, I finished my MSc degree in medical microbiology (Participating in teaching method training) and then started as an assistant lecturer in 2012 I was taught practical general botany, practical immunology, and sewage and soil microbiology and finally start teaching medical bacteriology in 2016 until the recent time.</p>
Course Objectives	<ul style="list-style-type: none"> • Learning methods of identification (staining, culturing on different media, biochemical tests) of medically important pathogenic bacteria. • Dealing, Collection and lab diagnosis of medical specimens like urine, blood, sputum, CSF, and other specimens from different infectious diseases. • Testing the effect of many antibacterial drugs to detect the most effective drug in the treatment of infectious diseases.
Intended Learning Outcomes	<p>Upon completion of this course students should be able to:</p> <ul style="list-style-type: none"> ➤ Learn isolation and identification of different pathogenic bacteria. ➤ Apply appropriate microbiology laboratory techniques, methodologies, instruments and

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	<p>equipment following the current laboratory safety protocol.</p> <ul style="list-style-type: none"> ➤ Develop diagnostic skills, including the use and interpretation of laboratory tests in the diagnosis of infectious diseases. ➤ Calculate, record, and report clinical microbiology results regarding pathogenic bacteria's culture and antibiotic sensitivity.
Student's Obligation and Safety Procedures	<ul style="list-style-type: none"> * Attendance at the lab on time. * Preparation for a sudden exam for the previous lab (quiz) * Wearing lab coat and gloves. * Sterilizing equipment and materials. * Disinfecting work areas before and after use. * Washing hands before leaving the laboratory. * Never pipette by mouth. * Smoking, eating or drinking in the lab and storing food in areas where microorganisms are stored aren't allowable. * Everything should be labelled clearly. * Long hair should be secured behind your head to minimize fire hazards or contamination of experiments. * Wiping and cleaning the lenses of the microscope before putting them away is necessary. Appropriate tissue paper and cleaning solution are used for this purpose. * Contaminated pipettes were never placed on the bench top. Contaminated cultures, glassware, pipettes, tubes, or slides are never discarded in the waste basket. Contaminated liquids or liquid cultures are never

	discarded in the sink. <ul style="list-style-type: none"> * Removing specimens, cultures, or equipment from the laboratory is not allowed under any circumstances. * At the start and end of each laboratory session, students should clean their assigned bench-top area with a disinfectant solution provided. * Keeping a complete record of all your experiments, and answering all questions at the end of each exercise. * If you are injured in the laboratory, immediately contact your course instructor or TA.
Forms of teaching	The class is presented using lecture/discussion, PowerPoint presentations, Whiteboard and paper printing, also uses slides either prepared by the students themselves or previously prepared slides (by the company) for explaining the microorganisms.
Outcome Assessment Strategies	Assessment methods may include written and practical examinations, homework assignments and discussion activities. Student knowledge application, laboratory performance, problem-solving skills, punctuality and attendance, participation, and communication skills are assessed in each laboratory.
Examinations and Grading	Two practical examinations will carry out during the course besides the assignments <p style="text-align: center;">Practical examination: 30% Attendance and assignments: 5%</p>

Course Reading List and References:	<ol style="list-style-type: none"> 1. Morello, J. A.; <u>Granato</u>, P. A. and Mizer, H. E. (2003). Laboratory manual and workbook in microbiology applications to patient care. 7th edition. McGraw-Hill. 2. <u>Vandepitte</u>, Jozef, <u>Engbaek</u>, <u>Kraesten</u>, <u>Rohner</u>, P, Piot, Peter, <u>Heuck</u>, Claus C. et al. (2003). Basic laboratory procedures in clinical bacteriology / J. <u>Vandepitte</u> ... [et al.], 2nd ed. World Health Organization. https://apps.who.int/iris/handle/10665/42696 3. TRIPATHI, N. & SAPRA, A. 2022. Gram Staining. <i>StatPearls</i>. Treasure Island (FL): StatPearls Publishing Copyright © 2022, StatPearls Publishing LLC. 4. Gillespie, S. H. and <u>Hawkey</u>, P. M. (2006). Principles and practice of clinical bacteriology. 2nd edition. Willey, England. 5. Johnson, T.R. and C.L. Case (2007) Laboratory Experiments in Microbiology. 6. <u>Forbers</u>, A. Betty, Daniel F. <u>Sahm</u> and Alice S. <u>Weissfeld</u>. (2007). Baily and Scotts. Diagnostic Microbiology. 12th ed. Mosby Elsevier.
Extra notes	I am passionate about my work. I would like to be a helpful person in my department and support anyone who wants to understand biology in general and microbiology in a specific line.

WEEKLY SYLLABUSES

Weeks	First Semester Syllabuses
1	Coursebook (safety rules)
2	Microscopic examination of bacteria (Tripathi and Sapra, 2022)
3	Cultivation of bacteria.
4	Biochemical tests.
5	Antimicrobial susceptibility testing: Disk diffusion test
6	Antimicrobial susceptibility testing: MIC and MBC
7	Lab. diagnosis of Gram-positive cocci: Staphylococci.
8	Lab. diagnosis of Gram-positive cocci: Streptococci.
9	Lab. diagnosis of pathogenic gram-negative cocci: <u>Neisseriae</u> .
10	Lab. diagnosis of spore-forming Gram-positive bacilli: Bacillus sp.
11	Lab. diagnosis of spore-forming Gram-positive bacilli: Clostridium sp.
12	Lab. diagnosis of non-spore-forming Gram-positive bacilli: <u>Corynebacterium diphtheria</u> .
13	Lab diagnosis of <u>Haemophilus</u> sp.
14	Practical Exam.