



Instructor:
Office #:

Lecture Time:

Office phone:
E-mail:

Office Hours:

Course description:

The course is designed to introduce the student of medical laboratory sciences to diagnostic microbiology practice, purpose, philosophy, organization, safety measures, selection, collection, and processing of specimens from specific diseases, isolation of disease cause, identification, and selection of antimicrobial therapy, with emphasis on automation, and fungal diagnostic techniques. The structure of microorganisms including the path-o-genetic properties of bacteria, fungi, and viruses will be examined in detail. Basic genetic and molecular biological concepts are integrated and connected to clinical manifestations of disease.

Aims of the course:

1. To understand the basics of structure of pathogenic microorganisms (bacteria, viruses and fungi) and pathogenic properties.
2. To identify the most common bacterial agents of human infections.
3. To select the optimal method for isolation and identification of common pathogens in clinical specimens (blood, urine, fluids, etc..).
4. Understand the mechanism of action of antibiotics.
5. Able to select the proper diagnostic method (conventional and automated).
6. Perform and interpret antimicrobial susceptibility testing procedures.
7. Perform fungal diagnostic techniques including culture and microscopy.
8. To practice laboratory procedures for handling of bio-hazardous agents.
9. Practice quality control and quality assurance according to contemporary clinical laboratory standards.

Intended Learning Outcomes: (ILOs)

A. Knowledge and Understanding

A1. Concepts and Theories: following the completion of the microbiology course the student will able to:

- 1- Understand the purpose and philosophy of clinical microbiology laboratory, safety measures, organization, and quality assurance.
- 2-Identify bacterial pathogens by means of key characteristics of metabolism, morphology, and pathogenesis.
- 3- Recommend the criteria of specimen selection, collection, storage, transport, and processing to recover pathogens from clinical specimens.
- 4- Apply appropriate laboratory techniques for identification of pathogenic microorganisms isolated from clinical specimens.
- 5- Demonstrate knowledge of the disease processes associated with specific etiologic agents of common diseases.
- 6- Demonstrate the Knowledge of nosocomial infections, and role of laboratory.
- 7-Discuss the mechanism of action of various antibiotics and antimicrobial agents.



- 8-Perform and interpret antimicrobial susceptibility testing procedures.
- 9- Practice safe laboratory procedures for handling of biohazardous agents.
- 10- Practice quality control and quality assurance according to contemporary clinical laboratory techniques..

A2. Contemporary Trends, Problems and Research: the course will give the student the opportunity to practice all laboratory procedures according to quality control standards.

A3. Professional Responsibility:

- 1- There are different practical activities that student can learn through the course and enrich his knowledge in different methods widely used in identification of microorganisms and methods used for testing sensitivity to antimicrobial substances.
- 2- The student will deal with qualitative and quantitative estimation of microorganisms, and this may be of interest due to the need to assure the quality of different pharmaceutical products.

B. Subject-specific skills

B1. Problem solving skills:

1. Develop the ability to prepare different microbial samples using suitable staining methods to be visualized by suitable microscope method.
2. Develop the ability to select the suitable method to grow bacteria for further studies
3. Solve problems related to antibiotic resistance..

B2. Modeling and Design:

- 1.Design appropriate protocol for collection of samples and identification of pathogens and constructing sterilization procedures.
2. Analyze laboratory results to evaluate infectious diseases.

B3. Application of Methods and Tools:

1. Apply the different methods used for bacterial identification and those for other microorganisms, staining, sterilization, and Antimicrobial susceptibility testing.
2. Select the suitable antimicrobial agent for treating infectious diseases
3. Apply appropriate safety measures during sample collection, handling, identification and disposal that match quality measures.

C. Critical-Thinking Skills

C1. Analytic skills: Assess: Develop the skills to identify different types of micro-organisms and to select the proper antimicrobial agent for treatment.

C2. Strategic Thinking: Students will develop the ability to make observations, record data and analyze results.

C3. Creative thinking and innovation: Design creative poster to microbiology world.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Communication:

1. Correctly perform skills for diagnosis of bacteriology.
2. Communicate effectively with the medical team concerning the results of laboratory tests in the diagnosis of diseases and control of infections.
3. Help physician to select the proper antimicrobial treatment to patient.
- 4.Develop the ability for group discussions and critical thinking.

D2. Teamwork and Leadership:

1. Participate in class through conducting discussion.
2. Work in groups for case study analysis and solving.



Course structures:

Week	Credit Hours	ILOs	Topics	Teaching Procedure	Assessment methods
1.	3	A1, B2, C1, D1,D2	<ul style="list-style-type: none"> • Introduction to diagnostic microbiology: Purpose and Philosophy. • Laboratory safety, organization, and quality control. 	Lecture with power point	Homework
2. - 4.	9	A1, B1, B2, C1, D1,D2	<ul style="list-style-type: none"> • Hospital epidemiology and nosocomial infections. • Traditional methods of cultivation, isolation, and identification of microorganisms. • Selection, collection, and transport of specimens. 	Lecturing with power point	Homework , Quiz
5.	3	A1, B1, B2, C1, D1, D2.	<ul style="list-style-type: none"> • Non traditional methods for identification and detection of pathogens. • Diagnostic immunologic principles and methods. 	Lecturing, discussion	1 st exam (20 points)
6.	3	A1, A2,, A3, B1, B2,C1, D1, D2	<ul style="list-style-type: none"> • Principles of automated methods for diagnostic microbiology. • Principles of testing antimicrobial action and resistance 	Lecturing, discussion	Homework
7-8.	6	A1, A2, A3, B1, B2 C1,D1, D2	<ul style="list-style-type: none"> • Principles of identification for isolation of etiologic agents recovered from clinical material (Blood, CSF, RT, GIT, URT, genital tract, transmitted wounds, abscesses, skin)= Microbial diseases of body organ. 	Lecturing, discussion	Homework, Quiz
9.	3	A1, , C1, D1	<ul style="list-style-type: none"> • Micrococcaceae: staphylococci and micrococci • Streptococci, including entero- 	Lecturing, discussion	Homework Quiz



			cocci and pneumococci		
10.	3	A1, C1,D1, D2	<ul style="list-style-type: none"> • Enterobacteriaceae • Nonfermentative gram-negative bacilli and coccobacilli (pseudomonas, alcaligenes, acinetobacter, etc..) 	Lecturing, discussion	Homework
11.	3	A1, C1,D1, D2	<ul style="list-style-type: none"> • Gram-negative facultatively anaerobic bacilli and aerobic coccobacilli. • Vibrionaceae 	Lecturing, discussion.	2 nd exam (20 points)
12.	3	A1, B2, C1, D1,D2	<ul style="list-style-type: none"> • Spirochetes • Aerobic or facultative spore-forming rods (Bacillus species) 	Lecturing, discussion.	Homework
13.	3	A1, B1, C1, D1,D2	<ul style="list-style-type: none"> • Aerobic, non spore-forming, gram positive bacilli • Processing of clinical specimens for anaerobic bacteria 	Lecturing, discussion	Homework, Quiz
14.	3	A1, B1 C1,D1, D2	<ul style="list-style-type: none"> • Anerobic gram-positive and gram negative bacilli, Anerobic cocci. • Chlamydia, Mycoplasma and Rickettsia. • Mycobacteria 	Lecturing, discussion	Homework
15.	3	A1, B1, C1, D1, D2	<ul style="list-style-type: none"> • Laboratory methods in basic virology and mycology 	Lecturing, discussion	
16.			Final Exam Week		Final Exam (50 points)

References:

A. Main Textbook:

Bailey and Scott's Diagnostic Microbiology, Forbes, Sahm and Weissfeld, Mosby Elsevier, 12th edition, 2007, [Http://evolve.elsevier.com/Forbes](http://evolve.elsevier.com/Forbes).

Assessment Methods:

Methods	Grade	Date
- First Exam	20%	The 5 th week
- Second Exam	20%	The 10 th week
- Assignments (quizzes, homeworks, participation)	10%	To be announced
- Final Examination	50%	The 16 th week

