



Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIED SCIENCES



Faculty of Laboratory medicine
Department of MICROBIOLOGY & IMMUNOLOGY
Course Specification of Diagnostic Microbiology I
Course No. (03.02.329)

I. Course Identification and General Information:				
1	Course Title:	Diagnostic Microbiology1		
2	Course Code & Number:	03.02.329		
3	Credit Hours:	Theory Hours		Credit Hours
		Lecture	Exercise	
		4	0	4
4	Study Level/ Semester at which this Course is offered:	4 th year / 1 st Semester & 2 nd Semester		
5	Pre –Requisite (if any):	Systemic virology, mycology & bacteriology		
6	Co –Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Bachelor in laboratory medicine		
8	Language of Teaching the Course:	English		
9	Study System:	Semester		
10	Mode of Delivery:	Regular		
11	Location of Teaching the Course:	University Campus		
12	Prepared by:	Dr. Ghamdan AL-tahish		
13	Date of Approval:	2022-2023		

II. Course Description

It provides students with knowledge on laboratory methods used to diagnose pathogens in clinical

specimens. Provide in depth Know the procedures used in diagnosis of microbial diseases and Identify different types of microorganisms by using different laboratory techniques. Also the course, will give the students theoretical and practical aspects of microbiological techniques., principles of automation, antimicrobial susceptibility testing, and infection control , their modes of action, host-parasite relationships, and identification of pathogenic and nonpathogenic Gram +ve and -Ve bacteria in clinical specimens. It will also focus on different Mycobacterial species. Each student will be required to identify unknown bacteria in different media.

III. Alignment Course Intended Learning Outcomes with program outcomes		
III. Course Intended Learning Outcomes (CILOs)	Referenced PILOs	
A. Knowledge and Understanding: <i>Upon successful completion of the course, students will be able to:</i>		
a1	Discuss the basic principles of diagnosis of the most likely pathogens and principles of biochemical tests used to identify isolated pathogen.	A1 Discuss the core aspects of laboratory medicine including Biochemistry. Anatomy. histology. Physiology. Cell Biology. Pathology. Immunology. Microbiology. Epidemiology. and Public Health Medicine
a2	Demonstrate the principles of antimicrobial sensitivity testing.	A2 Demonstrate advanced knowledge of his Laboratory Medicine specialist area; such as genetics. cellular pathology. clinical biochemistry. clinical immunology. hematology and transfusion science. and medical microbiology
B. Intellectual Skills: <i>Upon successful completion of the course, students will be able to:</i>		
b1	Select the correct clinical specimen collation in manner, isolation, characterization, and identification. distinguish positive and negative results and choose the appropriate antibiotic for susceptibility testing for isolated pathogens.	B2 Develop critical and analytical thinking to recognize errors and solve problems.
C. Professional and Practical Skills: <i>Upon successful completion of the course, students will be able to:</i>		
c1	Apply the principles of immunological and molecular	C2 Perform clinical laboratory tests commonly encountered in a hospital laboratory in the areas of Clinical Chemistry. Hematology.

	techniques for the diagnosis of infectious diseases		Immunoematology. Immunology. Microbiology. Histopathology and. Molecular Diagnostics.
c2	Perform clinical specimen collation in correct manner, isolation, characterization, identification. distinguish positive and negative results and choose the appropriate antibiotic for susceptibility testing for isolated pathogen.	C1	Apply the safety laboratory rules and regulations in handling and processing of test samples and maintaining working environment.
D. Transferable Skills: <i>Upon successful completion of the course, students will be able to:</i>			
d1	Educate the population and patients through acceptable customer service interactions, demonstrate oral and written effective communication skills,	D1	Educate the general public and to assist patients through acceptable customer service interactions

III. Alignment Course Intended Learning Outcomes with Teaching Strategies and Assessment methods :			
(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1	Discuss the basic principles of diagnosis of the most likely pathogens and principles of biochemical tests used to identify isolated pathogens.	<ul style="list-style-type: none"> Interactive lectures Self-learning Discussion 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes)
a2	Demonstrate the principles of antimicrobial sensitivity testing.	<ul style="list-style-type: none"> Interactive lectures Self-learning Discussion 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes)
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	Select the correct of clinical specimen collation in manner, isolation, characterization, and identification. distinguish positive and negative results and choose the appropriate antibiotic for susceptibility testing for isolated pathogens.	<ul style="list-style-type: none"> • Interactive lectures • Practical session • Discussion • Self-learning • Presentation 	<ul style="list-style-type: none"> • Written exam (mid and final terms and quizzes).
C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1	Apply the principles of immunological and molecular techniques for the diagnosis of infectious diseases	<ul style="list-style-type: none"> • Practical session • Self-learning 	<ul style="list-style-type: none"> • Written exam (mid and final terms and quizzes). • Final practical exam
c2	Perform clinical specimen collation in correct manner, isolation, characterization , identification. distinguish positive and negative results and choose the appropriate antibiotic for susceptibility testing for isolated pathogen.	<ul style="list-style-type: none"> • Practical session • Self-learning 	<ul style="list-style-type: none"> • Written exam (mid and final terms and quizzes). • Final practical exam
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	Educate the population and patients through acceptable customer service interactions, Demonstrate oral and written effective communication skills,	<ul style="list-style-type: none"> • Seminars • Discussion 	<ul style="list-style-type: none"> • Final practical exam • Final oral exam • Assignment: <ul style="list-style-type: none"> - Research - Homework - Teamwork

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	LE CT UR E	contact hours	Learning Outcomes
1	Introduction to diagnostic microbiology and Specimen Collection and Management	Definition of diagnostic microbiology, General Concepts in Specimen, definition and types of specimens, Collection & Handling of different specimens. Specimen transport and preservation. Lab Safety and Biological Safety Cabinets	1	2	a1,a2,b1,d1
	Principles of microbial diagnosis	Steps of microbial diagnosis, microscopic and culture characteristic, selection of biochemical tests, serological and molecular methods, and	1	2	a1,a2,b1,d1
2	Antibiotic Susceptibility Testing	Antimicrobial Susceptibility Testing Methods: Selection of Antimicrobial agents Resistance Supplemental Methods for Antimicrobial Resistance detection	2	4	a1,a2,b1,d1
3	Blood stream Infections:	Anatomy of circulation system (Terminology, types and mechanism of infection, etiology, epidemiology, clinical features, conventional and rapid diagnostic methods, Treatment and prevention) <input type="checkbox"/> Enteric fever / Typhoid fever, Bacterial endocarditis, <input type="checkbox"/> Bacteraemia, Septicemia, Pyrexia of unknown origin (PUO). <input type="checkbox"/> intravenous catheter associated infection. Blood Specimen: collection, transportation, cultivation, identification, susceptibility testing of isolated pathogen and writing final report	2	4	a1,a2,b1,d1
4	Gastrointestinal infections:	Anatomy and physiology of Gastrointestinal tract Resident microbial flora (Terminology, types and mechanism of infection, etiology, epidemiology, clinical features, conventional and rapid diagnostic methods Treatment and prevention) Food poisoning, Traveler's Diarrhoea,	2	4	a1,a2,b1,d1

		Food poisoning, Cholera , salmonella ,shigella Antibiotic Associated Diarrhea , <i>E. coli</i> strains <u>associated with diarrhoeal disease</u> Stool Specimen: collection, transportation, cultivation, identification, susceptibility testing of isolated pathogen and writing final report			
	MED TERM EXAM		1	2	a1,a2,b1,d1
5	Upper Respiratory Tract Infections (RTIs):	Anatomy of URT, normal flora (Terminology, types and mechanism of infection, etiology, epidemiology, clinical features, conventional and rapid diagnostic methods, Treatment and prevention) Rhinitis, Epiglottitis, croup Pharyngitis and tonsillitis, Diphtheria Nasal carriage Nasal, Throat and nasopharyngeal Specimens: Collection, transportation, cultivation, identification, susceptibility testing of isolated pathogen and writing final report	1	2	a1,a2,b1,d1
6	Lower Respiratory Tract Infections (RTIs):	Anatomy of LRT (Terminology, types and mechanism of infection, etiology, epidemiology, clinical features, conventional and rapid diagnostic methods, Treatment and prevention) Pneumonia, bronchitis, Bronchiolitis Mycobacterium tuberculosis, Fungal and anaerobic infection Sputum Specimens : collection, transportation, cultivation, identification, susceptibility testing of isolated pathogen and writing final report	1	2	a1,a2,b1,d1
7	Oral, Throat and Stomach Infections:	(Terminology, mechanism of infection, etiology, conventional and rapid diagnostic methods) oral cavity infection: Vincent angina (trench mouth): Stomatitis Oral Thrush Periodontal infections Stomach Infections : Peptic ulcer (<i>H. pylori</i>). Oral specimens: collection, transportation, Processing , cultivation, identification, susceptibility testing of isolated pathogen and writing final report	1	2	a1,a2,b1,d1
8	Urinary Tract Infection:	Anatomy of UT, normal flora (Terminology, types and mechanism of infection,	2	4	a1,a2,b1,d1



		etiology, epidemiology, clinical features, conventional and rapid diagnostic methods, Treatment and prevention) Cystitis Pyelonephritis. Acute urethral syndrome Asymptomatic bacteriuria Uncomplicated and complicated UTI Urine Specimens: collection, transportation, cultivation, identification, susceptibility testing of isolated pathogen, colonies Count , interpretation and writing final report			
9	Ear Infections	Anatomy of ear (Terminology, mechanism of infection, etiology, conventional and rapid diagnostic methods) <input type="checkbox"/> Otitis media, <input type="checkbox"/> External ear Ear specimen : collection, transportation, cultivation, identification, susceptibility testing of isolated pathogen and writing final report	1	2	a1,a2,b1,d1
10	FINAL EXAM				a1,a2,b1,d1
19	Final exam		2	2	
	Number of Weeks /and Units Per Semester		32	36	

B- Practical Aspect

Order	Practical Experiments	Number of Weeks	Contact Hours	Learning Outcomes
LAB 1	Lab safety and Specimen Collection, General View on the Parameters Used in the Process of Microorganism	1	2	c1,c2

LAB 2	Ear swab , Collection, transportation, culturing, isolation, identification, staining (Gram) of particular specimens and antibiotic sensitivity tests.	1	2	c1,c2
LAB 3	Throat, and nose swab Collection, transportation, culturing, isolation, identification, staining of particular specimens and antibiotic sensitivity tests.	1	2	c1,c2
LAB 4	Sputum Collection, transportation, culturing, isolation, identification, staining (Gram & ZN) of particular specimens and antibiotic sensitivity tests.	1	2	c1,c2
LAB 5	Urine (MSU) Collection, transportation, culturing, isolation, identification, staining of particular specimens and antibiotic sensitivity tests.	1	2	c1,c2
LAB 6	Stool culture: Collection, transportation, culturing, and identification of microorganisms. -Parasites, pus cells, red cells, and other findings.	1	2	c1,c2
Number of Weeks/Contact Hours per Semester		10	20	

V. Teaching Strategies of the Course:	
1-	Lectures
2-	Practical session
3	self learning
4	saminar



VI. Assessment Methods of the Course:

No	Assignment
1	Written Exams (Short Essays) and Quizzes
2	Multiple Choice Questions (MCQ)
3	Practical Exams (PE)
4	assignment

VII. Assignments:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Assignments		5	5%	,d1
1	Midterm Exam	8	15	15%	,a1,a2,b1
2	Practical exam	14	30	30%	,c1,c2
3	Final Exam	16	50	50%	,a1,a2,b1,d1,
	Total	100		100%	

IX. Learning Resources:

1- Required Textbook(s) (maximum two).

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| 1- | Delost, Maria. (2015). Introduction to Diagnostic Microbiology for the Laboratory Sciences: Jones and Bartlett. ISBN 9781284032314. |
| 2- | Mim's Medical Microbiology. Richard V Goreing, 4th edition (2008); Publisher: Elsevier publications |
| 3. | Oxford Handbook of Infectious Diseases and Microbiology. Second edition. Oxford University Press 2017 |

2- Essential References.

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|----|---|
| 1- | Jawetz, Melnick, & Adelberg's Medical Microbiology, 28e Riedel, Stefan
Published by McGraw-Hill Education, 2019 ISBN 10: 1260012026 ISBN 13: 9781260012026 |
| 2- | Bailey & Scott's Diagnostic Microbiology 15th Edition Patricia M. Tille- February 4, 2021 |

3- Electronic Materials and Web Sites etc.

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| 1- | https://sites.google.com/site/allmicrobiologysite/
https://Asm.org |
| 2- | http://medicallabtechno.weebly.com/uploads/7/5/1/5/7515789/monica-cheesbrough_district-laboratory-practice-in-tropical-countries-part-1.pdf |
| 3- | https://sites.google.com/site/allmicrobiologysite/diagnostic-medical-microbiology |
| 4- | http://www.microbelibrary.org |
| | http://www.bact.wisc.edu/Bact330/330Lecturetopics |

XI. Course Policies:

1	<p>Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
2	<p>Tardiness: -If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course</p>
3	<p>Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
4	<p>Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
5	<p>Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
6	<p>Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
7	<p>Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration</p>