



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 Advanced Medical Parasitology

Course No. (03.12. 320)

2020/2021

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Associate Prof. Dr Rashad Ahmed Ali Abdulgan	Assistant Prof. Dr Ghamdan Al-Tahish	Dr.Gamil Taher Abdul Mughni	Dr.Gamil Taher Abdul Mughni	Associate Prof. Dr. Ebtessam Al-Zabedi



Republic of Yemen  
Ministry of Higher Education & Scientific Research  
21 SEPTEMBER UMAS  
Faculty of Laboratory medicine  
Department of MICROBIOLOGY & IMMUNOLOGY  
Unit of Development & Quality assurance

الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
جامعة ٢١ سبتمبر للتعليم الطبي والتطبيقية  
كلية الطب المخبري  
قسم الاحياء الدقيقة والمناعة  
وحدة التطوير وضمان الجودة

I. Course Identification and General Information:					
1	Course Title:	Advanced Medical Parasitology			
2	Course Code & Number:	03.12. 320			
3	Credit Hours:	Theory Hours			
		Lecture	Exercise	Practical	Credit Hours
		2	1	1	3
4	Study Level/ Semester at which this Course is offered:	1st Level / 1st Semester			
5	Pre-Requisite (if any):	Advanced Microbiology, Advanced Immunology			
6	Co-Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Maste degeee of microbiology & immunology			
8	Language of Teaching the Course:	English			
9	Study System:	semester			
10	Mode of Delivery:	rgular			
11	Location of Teaching the Course:	University Campus			
12	Prepared by:	Dr. ----			
13	Date of Approval:				

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Associate Prof. Dr Rashad Ahmed Ali Abdulgani	Assistant Prof. Dr Ghamdan Al-Tabish	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	Associate Prof. Dr. Ebtesam Al-Zabdi



## II. Course Description:

This course is an advanced study of the biology, life cycles, pathogenesis, diagnosis, and treatment of parasitic infections. The course is designed for students who are interested in pursuing a career in research, control, or teaching related to medical parasitology.

## III. Course objective:

- Identify and classify parasites using morphological and microscopic techniques
- Describe the life cycles of parasites and the mechanisms by which they are transmitted
- Discuss the pathogenesis of parasitic infections and the clinical manifestations of these infections
- Interpret laboratory results for parasitic infections
- Develop and implement treatment plans for parasitic infections
- Conduct research on parasitic infections
- Communicate effectively about parasitic infections to patients, colleagues, and the public

Identify parasites under the microscope

Interpret laboratory results for parasitic infections

Develop and implement treatment plans for parasitic infections

demonstrate detailed knowledge and understanding of the biology and strategies for control of the vectors and intermediate hosts of human parasites; (iii) carry out practical laboratory identification of the various parasite stages both free and in tissues and diagnose infections; (iv) demonstrate specialised skills acquired through taking Modules on: advanced diagnostic, molecular, immunological, genetic, chemotherapeutic, ecological and/or control aspects of the subject; (v) demonstrate the ability to design a laboratory or field based research project, apply relevant research skills, critically analyse and interpret data, and work with minimal supervision;

Explain the host defense mechanisms against parasitic infections and mechanisms of co-infections

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III. Alignment Course Intended Learning Outcomes with program outcomes

III. Course Intended Learning Outcomes (CILOs)

Referenced PILOs

A. Knowledge and Understanding:

Upon successful completion of the course, students will be able to:

a1	Demonstrate detailed knowledge and understanding of the biology, life cycles, pathogenesis, diagnosis of parasitic infections in humans and their relevance for human health and strategies for control;	
A2	Identify morphological, biological and epidemiological characteristics of the main parasites and microorganisms involved in human health. Associate the characteristics of major infectious diseases caused by parasites with prevention and possible treatments	

B. Intellectual Skills:

Upon successful completion of the course, students will be able to:

b1	Explain the host defense mechanisms against parasitic infections and mechanisms of co-infections	
B2	Performs	
B3		

C. Professional and Practical Skills:

Upon successful completion of the course, students will be able to:

c1		
c2		

D. Transferable Skills:

Upon successful completion of the course, students will be able to:

d1	Communicate with patients and their families to avoid further exposure to parasites	
d2		

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IV. 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		Lecture	Exam
	Discuss the relationship between each parasite and its host		

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	Investigate the different ways by which the parasites damage their hosts and the response of the host		
b2			
b3			

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	e the laboratory diagnosis of fecal samples, blood, tissues and other excretions.		
C2			

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
	Communicate with patients and their families to avoid further exposure to parasites		
❖			

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**V. Course Content:**

**A – Theoretical Aspect:**

N O.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction to medical parasitology	Basic concepts and definitions, history of medical parasitology, importance of medical parasitology in public health, and overview of the course.	1	1	
2	Protozoan parasites	Classification, morphology, life cycle, pathogenesis, and clinical manifestations of protozoan parasites such as Plasmodium, Trypanosoma, Leishmania, and Entamoeba.	1	2	
3	Helminth parasites	3. Helminth Parasites: Classification, morphology, life cycle, pathogenesis, and clinical manifestations of helminth parasites such as nematodes, cestodes, and trematodes.	1	2	
4	Arthropod parasites	4. Arthropod Parasites: Classification, morphology, life cycle, pathogenesis, and clinical manifestations of arthropod parasites such as ticks, mites, and lice.	1	2	

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5	Pathogenesis and clinical manifestations of parasitic infections	5. Pathogenesis and Clinical Manifestations of Parasitic Infections: Mechanisms of pathogenesis, immune responses, and clinical manifestations of parasitic infections.	1	2	
6	Laboratory diagnosis of parasitic infections	Laboratory Diagnosis of Parasitic Infections: Microscopic, serological, immunological, and molecular methods used for the diagnosis of parasitic infections.	1	2	
7	Antiparasitic drugs and treatment strategies	Mechanisms of action, pharmacokinetics, and side effects of antiparasitic drugs, and different treatment strategies for parasitic infections.	1	2	
8	Prevention and control of parasitic infections	Strategies for the prevention and control of parasitic infections, including vector control, sanitation and hygiene, and vaccination.	1	2	
8	Emerging and reemerging parasitic infections	Recent trends in the epidemiology of parasitic infections, including emerging and reemerging diseases such as Zika virus, Chagas disease, and	1	2	

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		schistosomiasis.			
9	Research and developments in medical parasitology	Current research and developments in the field of medical parasitology, including new diagnostic methods, drug development, and vaccine research.	1	2	
16	FINAL THEORTICAL				
			16	32	

**B - Practical Aspect: (if any)**

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
<b>Number of Weeks /and Units Per Semester</b>				

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#### V. Teaching Strategies of the Course:

1-	Lectures
2-	Practical session
3-	Seminars
	Lectures , seminars
	Practical sessions
	Discussion

#### VI. Assessment Methods of the Course:

No	Assessment
1	Written Exams (Short Essays) and Quizzes
2	Written Exams(MCQ)
3	Structured Oral Exams
4	Objective Structured Practical Exams (OSPE)
5	Student presentation

#### VII. Assignments:

No.	Assessment Method	Week Due	Mark	Aligned Course Learning Outcomes
1	Midterm Exam	7	20	20%
2	Practical exam	12	30	30%
3	Final Exam	14	50	50%
4				
	Total		100	100%

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**IX Schedule of Assessment Tasks for Students During the Semester:**

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1					
2					
3					
4					
5					
6					
<b>Total</b>					

**X. Learning Resources:**

• Written in the following order: ( Author - Year of publication - Title - Edition - Place of publication - Publisher).

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

- 1- Bogitsh B.J., Carter C.E., Oeltmann T.N. (eds.) (2005). Human Parasitology, Elsevier Academic Press.
- 2- Mandal F.B. (ed.) (2011). Human Parasitology, PHI.

**2- Essential References.**

- 1- Cox F.E.G. (ed.) (2009). Modern Parasitology: A Text Book of Parasitology, Blackwell Science Ltd.
- 2-
- 3-

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**XI. Course Policies:**

1	<b>Class Attendance:</b> -If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
2	<b>Tardy:</b> - If the student is late for the lectures for the 2nd time, he will not be allowed to attend this lecture
3	<b>Exam Attendance/Punctuality:</b> - If any student does not attend the exam in the scheduled day, it will consider as a fail for him
4	<b>Assignments &amp; Projects:</b> - Any student dose not submithis assignment,he will lose its grade.
5	<b>Cheating:</b> - ANY STUDENT TRY TO CHEAT IN ANY QUIZ OR EXAM, HE WILL NOT BE ALLOWED TO CONTINUE THE EXAM AND IT WILL CONSIDER AS A FAIL FOR HIM
6	<b>Plagiarism:</b> - If any student try to plagiarism another student identity, both of them will be convertedto investigation and they might be expelled from the program
7	<b>Other policies:</b> - Undelivered requirement will not be marked - You should leave your dental Chair as clean as possible

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Republic of Yemen  
Ministry of Higher Education & Scientific Research  
21 September university for medical & applied sciences



Faculty of Laboratory medicine..

Department of MICROBIOLOGY & IMMUNOLOGY

Course Specification of Advanced Medical Immunology II

Course No. (03.12. 319)

2020/2021

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\Gamil Taher Abdul Mughni	Assistant Prof. Dr Ghamdan Al-Tahish	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	Assistant prof. Dr Ebtessam AlZabedi



**I. Course Identification and General Information:**

1	Course Title:	Advanced Medical Immunology II			
2	Course Code & Number:	03.12. 319			
3	Credit Hours:	Theory Hours			
		Lecture	Exercise	Practical	Credit Hours
		2	0	0	2
4	Study Level/ Semester at which this Course is offered:	1 <sup>st</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Advanced Medical immunology I			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Master Degree In Microbiology & Immunology			
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. Gamil Taher Abdul Mughni			
13	Date of Approval:				

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr. Gamil Taher Abdul Mughni	Assistant Prof. Dr. Ghandar Al-Tahish	Dr. Gamil Taher Abdul Mughni	Dr. Gamil Taher Abdul Mughni	Assistant prof. Dr. Ebtessam Al-Zabedi



## II. Course Description:

This course is designed to provide an in-depth understanding of the cellular and molecular mechanisms underlying the immune response. The course will cover the cellular components of the immune system, including T and B cells, dendritic cells, and macrophages, as well as the molecular processes involved in antigen recognition, processing, and presentation. Topics to be covered include immune cell signaling, cytokine regulation, immune cell development, immune surveillance, immune evasion, and immunotherapy. The course will also cover current research topics in cellular and molecular immunology.

## III. Alignment Course Intended Learning Outcomes with program outcomes

III. Course Intended Learning Outcomes (CILOs)	Referenced PILOs
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### A. Knowledge and Understanding:

Upon successful completion of the course, students will be able to:

a1	Describe the cellular and molecular components of the immune system and explain their roles in immune responses.	A2
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### B. Intellectual Skills:

Upon successful completion of the course, students will be able to:

b1	Illustrate the molecular mechanisms of antigen recognition, processing, and presentation	B1
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### C. Professional and Practical Skills:

Upon successful completion of the course, students will be able to:

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c1	<b>Demonstrate</b> the cellular and molecular processes underlying immune cell development, activation, and differentiation.	CI
<b>D. Transferable Skills:</b>		
Upon successful completion of the course, students will be able to:		
d1		

IV. 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	<b>Describe</b> the cellular and molecular components of the immune system and explain their roles in immune responses.	Lectures	Exam

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	<b>Illustrate</b> the molecular mechanisms of antigen recognition, processing, and presentation	Lectures Practical session	Exam Practical Exams

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	<b>Demonstrate</b> the cellular and molecular processes underlying immune cell development, activation, and differentiation.	Lectures Practical session	Exam Practical Exams

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching	Assessment
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		strategies	Strategies
d1		Lectures Practical session	Exam Practical Exams

### III. Course Content:

#### A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to Cellular and Molecular Immunology	- Overview of the immune system - Cellular and Molecular components of the immune system - Innate vs. adaptive immunity	1	2	a1,b2,c1
2	T-Development	-Lymphocyte Development and -Antigen Receptor Gene -Rearrangement -Positive and negative selection	1	2	a1,b2,c1
3	B-Development		1	2	a1,b2,c1
4	Innate immunity -Antigen Recognition - Structure and function of	Structure and function of immune receptors 1-Innate - Pattern recognition receptor	1	2	a1,b2,c1
	Macrophages Dendritic Cells Mast Cells Natural Killer Cells Inflammation	Development of macrophages Monocytes Tissue macrophages Macrophages receptors Toll-like receptors (TLRs) Cytokine receptors Macrophages activation Phagocytosis Release of cytokines Macrophages effector functions Phagocytosis Release of cytokines Cell lysis Macrophages regulation	1	2	a1,b2,c1
	Antigen processing and	Major Histocompatibility Complex		2	a1,b2,c1

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وحدة التطوير وضمان الجودة

	presentation	Molecules Class I MHC Molecules Class II MHC Molecules			
6	Adaptive Immune System	Antigen Recognition, Antigen processing Antigen presentation	1	2	a1,b2,c1
7	T Lymphocytes	- T cell activation and differentiation - Immune Receptors and Signal Transduction - Signal transduction pathways and intracellular signaling molecules	1	2	a1,b2,c1
8	Effector Mechanisms of T Cell-Mediated Immunity	T-helper cells (Th1, Th2, Th17) Regulatory T-cells	1	2	a1,b2,c1
9	Cytotoxic T-cells	-Development of CTLs -CTL receptors -CTL activation -CTL effector functions -CTL regulation -Role of CTLs in the : -Immune response -Therapies	1	2	a1,b2,c1
10	NK cells	• Development of NK cells • NK receptors • NK activation • NK effector functions • NK regulation	1	2	a1,b2,c1
11	B cell	-B-cell activation -maturation -Differentiation -Activation - Signal transduction pathways and intracellular signaling molecules	1	2	a1,b2,c1
12	B&T-cells signaling		1	2	a1,b2,c1
13	Cytokine	Cytokine signaling: Janus kinase (JAK)/signal transducer and activator of transcription (STAT) pathways and nuclear factor kappa B (NF-κB) pathways	2	4	A1
14	Immune cell trafficking:	-Migration -adhesion			a1,b2,c1

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		-Cytokines -Chemkines - Cytokine signaling and regulation			
	Immunotherapy	checkpoint inhibitors adoptive cell therapy monoclonal antibodies			a1,b2,c1
	Cell surface molecules involved in immune response.				a1,b2,c1
	Stem cell and the immune system				a1,b2,c1
	Final exam		1		a1,b2,c1
	Number of Weeks /and Units Per Semester			32	

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**B - Practical Aspect: (if any)**

Order	Tasks/ Experiments	Subtile	Number of Weeks	contact hours	Learning Outcomes
1	Animal models	1. Human studies: advantages versus disadvantages  2. Brief overview of different animal models that can be used to study immunological concepts • Knock-out • Knock-in	1	2	cl
2	Cellular techniques considerations	Cellular techniques 1. Overview of sample preparation consideration 2. Overview of assay sensitivity versus specificity 3. in vitro, ex vivo, in vivo experiments - differences and techniques 4. Isolation of immune cells from tissue 5. Flow cytometry	2	4	Cl
8	Antibodies for research, diagnostics, and therapeutics	Antibodies for research, diagnostics, and therapeutics 1. Introduction 2. Generation of antibodies	2	4	Cl

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		for research and clinical use 3. Immunoassays • Pros and cons • Overview of technical concepts • Interpretation of Results • Examples o ELISA/EIA/ELISPOT o Western Immunoblot o Immunohistochemistry and immunofluorescence o Microscopic imaging o Flow cytometry			
3	Flow cytometry	1. Overview of technical concepts • Overview of instrumentation • Controls for experiments • Sample preparation • Data acquisition Interpretation of results Cellular analysis versus cell sorting	2	4	C1
Number of Weeks /and Units Per Semester					

**V. Teaching Strategies of the Course:**

1-	Lectures
2-	Practical session
3-	Self leaning
4-	Group research

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VI: Assessment Methods of the Course:

No	Assignment	
1	Written Exams (Short Essays) and Quizzes	A1.
2	Written Exams(MCQ)	
3	Structured Oral Exams	
4	Objective Structured Practical Exams (OSPE)	
5	Student presentation	

VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
1	Midterm Exam	7	15	15%	A,b,c,d
2	Activity	Throughout the semester	5	5%	b
3	Practical Report	Throughout the semester	10	10 %	C
4	Practical exam	12	20	20%	C

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5	Final Exam	14	50	50%	
Total					

### IX. Learning Resources:

Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).

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

- 1- Janeway's Immunobiology, 9th edition, by Kenneth Murphy, Paul Travers, and Mark Walport.
- 2- "Cellular and Molecular Immunology" by Abul K. Abbas, Andrew H. Lichtman, and Shiv Pillai. This textbook is known for its clear explanations of complex topics in immunology, and has a strong focus on cellular and molecular mechanisms.

#### 2- Essential References.

- 1- "Basic Immunology: Functions and Disorders of the Immune System" by Abul K. Abbas and Andrew H. Lichtman
- 2- Principles of Immunology by Ivan Roitt, Peter Delves, and Seamus Martin - This textbook provides a comprehensive introduction to immunology, covering both the cellular and molecular aspects of the immune response

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### 3- Electronic Materials and Web Sites etc.

- 1- The Immunology Database and Analysis Portal  
- <https://www.immunedb.com/>
- 2- The National Institute of Allergy and Infectious Diseases –  
<https://www.niaid.nih.gov/>
- 3- The Journal of Immunology –  
<https://www.jimmunol.org/>
- 4- The Immune System and Immunology  
- <https://www.ncbi.nlm.nih.gov/books/NBK279364/>  
The American Association of Immunologists  
- <https://www.aai.org/>

### XI. Course Policies:

- 1 **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.
- 2 **Tardiness:**  
-If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
- 3 **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.
- 4 **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.
- 5 **Cheating:**  
Cheating is an act of fraud that results in the cancelation of the student's exam or

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	assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> 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.
7	<b>Other policies:</b> 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

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Republic of Yemen  
Ministry of Higher Education & Scientific Research  
21 SEPTEMBER UMAS  
Faculty of Laboratory medicine  
Department of microbiology & immunology  
Unit of Development & Quality assurance



وزارة التعليم العالي والبحث العلمي  
جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية  
كلية الطب المخبري  
قسم الأحياء الدقيقة والمناعة  
وحدة التطوير وضمان الجودة

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 Advanced ~~Molecular~~ Diagnostic Microbiology  
Course No. (03.12. 318)  
2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Assistant Prof. Dr. Ghamdan Al-Tahish	Prof. Dr. Khalid A. AL-Moyed	Dr Gamil Taher Abdul Mughni	Dr Gamil Taher Abdul Mughni	Ass.Pr/Dr Ebtesam Al-Zabedi



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I. Course Identification and General Information:				
1	Course Title:	Advanced Molecular Diagnostic Microbiology		
2	Course Code & Number:	03.12. 318		
3	Credit Hours:	Theory Hours		
		Lecture	Exercise	Practical
4	Study Level/ Semester at which this Course is offered:	2nd Level / 2nd Semester		
5	Pre -Requisite (if any):	Advanced Molecular microbiology		
6	Co -Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Master of Medical Microbiology & Immunology		
8	Language of Teaching the Course:	English		
9	Study System:	Semester		
10	Mode of Delivery:	Full times		
11	Location of Teaching the Course:	University Campus		
12	Prepared by:	Dr. Ghamdan Altahish i		
13	Date of Approval:	2022-2023		

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
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**II. Course Description:**

This course aims to provide advanced knowledge and skills in the field of diagnostic microbiology. It covers the principles and applications of advanced diagnostic techniques] used for the identification and characterization of bacteria, viruses, fungi, and parasites. Covering range of molecular techniques used for laboratory diagnosis and management of infections, such as nucleic acid extraction PCR-based methods, blotting techniques, electrophoresis, microarray, In Situ Hybridization, bioinformatics and DNA sequencing. The course focuses on the interpretation of laboratory results and the development of effective treatment strategies for infectious diseases.

**III. Alignment Course Intended Learning Outcomes with program outcomes**

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
<b>A. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
a1	Understand the principles and applications of advanced and molecular diagnostic techniques used in diagnostic microbiology	A1
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
b1	Analyze and interpret molecular data of microbial genomes for the identification and characterization of virulence factors , the diagnosis and treatment of infectious diseases.	B4
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
c1	Apply molecular microbiology methodologies in scientific research aimed at solving problems.	C3
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
d1		D2

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IV. 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	Understand the principles and applications of advanced and molecular diagnostic techniques used in diagnostic microbiology	Lectures	Exam

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	Analyze and interpret molecular data of microbial genomes for the identification and characterization of virulence factors , the diagnosis and treatment of infectious diseases.	Lectures	Exam

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 molecular microbiology methodologies in scientific research aimed at solving problems.	Lectures	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		Lectures	Exam

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**IV. Course Contents:**

**A. Theoretical Aspect:**

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Nucleic acid extraction	DNA extraction methods – Sample source, assessment of quality and quantity, nucleic acid storage	1	2	a1,b4,c1
2	Nucleic acid extraction	RNA extraction methods Sample source, assessment of quality and quantity, nucleic acid storage	1	2	a1,b4,c1
3	blotting techniques	Identification Hybridization , blotting and probe. Types , procedures and uses of blotting techniques Southern, northern and dot/slot blot; RFLP : (Principles. steps. Reaction Components and Applications);2	1	2	a1,b4,c1
4	In situ nucleic acid hybridization & DNA Microarray	FISH: (Principles steps Reaction Components Applications) DNA chip (Principles steps . Reaction Components applications )	1	2	a1,b4,c1
5	nucleic acid amplification techniques	Types PCR: principles applications  Principles steps reaction Components Variants of the PCR Applications	1	2	a1,b4,c1

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		optimization of PCR reactions, contaminants, analysis and verification of PC R products			
6	nested PCR , multiplex PCR and hot start PCR Reverse transcriptase PCR,	Principles steps reaction Components Variants of the PCR Applications	1	2	a1,b4,c1
7	Med tem		1	2	a1,b4,c1
8	Electrophoretic	TYPES Principles steps reaction Components Applications	1	2	a1,b4,c1
9	Real-time PCR	Principles steps Reaction Components Applications	1	2	a1,b4,c1
10	DNA sequencing techniques	applications of DNA sequencing in the clinical laboratory. Principles steps reaction Components Applications	1	2	a1,b4,c1
11	recombinant DNA technology	Principles steps reaction Components Applications	1	2	a1,b4,c1
12	DNA CLONING	Principles steps Reaction Components Applications	1	2	a1,b4,c1
13	TMA SDA	Principles types Reaction Components	1	2	a1,b4,c1

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		Applications			
١٤	LAMP LCR	Principles types Reaction Components Applications	1	2	a1,b4,c1
١٥	Typing	Principles Types steps applications	1	2	a1,b4,c1
١٦	Final Theoretical Exam		1	2	a1,b4,c1
Number of Weeks /and Units Per Semester			16	32	

#### V. Teaching Strategies of the Course:

1-	Lectures
2-	Practical session
3-	Self leaning
4-	Group research

#### VI. Assessment Methods of the Course:

No	Assignment	
1	Written Exams (Short Essays) and Quizzes	a1,b4,c1
2	Written Exams(MCQ)	a1,b4,c1
3	Structured Oral Exams	a1,b4,c1
4	Objective Structured Practical Exams (OSPE)	a1,b4,c1
5	Student presentation	a1,b4,c1

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#### VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
1	Midterm Exam	7	15	15%	a1,b4,c1
2	Activity	Throughout the semester	5	5%	a1,b4,c1
3	Practical Report	Throughout the semester	10	10 %	a1,b4,c1
4	Practical exam	12	20	20%	a1,b4,c1
5	Final Exam	14	50	50%	a1,b4,c1
<b>Total</b>					

#### IX. Learning Resources:

- Written in the following order: Author, Year of publication, Title, Edition, Place of publication, Publisher.

##### 1- Required Textbook(s) ( maximum two ): مثال example

- 1- Brooker, R. J. (2009). *Genetics: Analysis & principles*. New York, NY: McGraw-Hill.
- 2- Coleman, W. B., & Tsongalis, G. J. (1997). *Molecular diagnostics: For the clinical laboratorian*. Totowa, NJ: Humana Press.
- 3- Glick, B. R., Pasternak, J. J., & Patten, C. L. (2010). *Molecular biotechnology: Principles and applications of recombinant DNA*. Washington, DC: ASM Press

##### 2- Essential References:

- 1- Lela Buckingham and Maribeth Flaws .Molecular Diagnostics: Fundamentals, Methods and Clinical Applications, 2nd edition. ISBN-13: 978-0-8036-2677-5
- 2- Lela Buckingham and Maribeth Flaws , Molecular Diagnostics: Fundamentals, Methods and Clinical Applications, 2007, ISBN-13: 978-0-8036-1659-2, ISBN-10: 0-8036-1659-7  
ISBN-10: 0-8036-1659-7
- 3- Lela Buckingham and Maribeth Flaws , Molecular Diagnostics: Fundamentals, Methods and Clinical Applications, 2007, ISBN-13: 978-0-8036-1659-2, ISBN-10: 0-8036-1659-7  
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### 3- Electronic Materials and Web Sites etc.:

#### Websites:

- 1- <http://www.asmusu.org>
- 2- <http://www.phage.org/black09.htm>
- 3- [http://www.microbe.org/microbes/virus\\_or\\_bacterium.asp](http://www.microbe.org/microbes/virus_or_bacterium.asp)

#### Journals:

4-

#### Other Web Sources:

5-

6-

### XI. Course Policies:

1	<b>Class Attendance:</b> 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.
2	<b>Tardiness:</b> -If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
3	<b>Exam Attendance/Punctuality:</b> 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.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> 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.
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