

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 Biomedical Statistics & Epidemiology  
Course No. (03.12. 312)  
2020/2021

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



I. Course Identification and General Information:				
1	Course Title:	Biomedical Statistics & Epidemiology		
2	Course Code & Number:	03.12. 312		
3	Credit Hours:	Theory Hours		
		Lecture	Exercise	Practical
		2	1	1
4	Study Level/ Semester at which this Course is offered:	1st Level / 1st Semester		
5	Pre -Requisite (if any):	None		
6	Co -Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Master degree of 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. ----		
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	Prof. Dr. Khalid A. AL-Moyed	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	Assistant prof. Dr. Ebtessam Al-Zabedi



## II. Course Description:

This course provides an advanced introduction to the statistical and epidemiological methods used in public health research. Topics include descriptive statistics, probability distributions, parameter estimation, hypothesis testing, sampling techniques, analysis of variance, and correlation. It provides basic training in statistical analysis using statistical software

## 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	understand the basic concepts of epidemiology and statistical reasoning to public health research	A1
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#### B. Intellectual Skills:

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

b1	Identify and assess causal relationships between exposures and outcomes	B1
B2	Select and apply appropriate statistical methods to analyze data	B2
B3	Design and conduct research studies.	B3

#### C. Professional and Practical Skills:

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

c1	Interpret the results of statistical analyses	C1
c2	Use statistical software to analyze data	C4

#### D. Transferable Skills:

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

d1	Communicate the results of statistical analyses to others	D1
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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	<b>understand</b> and apply the basic concepts of epidemiology and statistical reasoning to public health research	Lecture	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>Identify</b> and assess causal relationships between exposures and outcomes	Lecture	Exam
b2	<b>Select</b> and apply appropriate statistical methods to analyze data	Lecture	Exam
b3	<b>Design</b> and conduct research studies.	Lecture	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	<b>interpret</b> the results of statistical analyses	Lecture	Exam
C2	Use statistical software to analyze data	Lecture	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	❖ communicate the results of statistical analyses to others	Lecture	Exam

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

1-	Lectures
2-	Practical session
3-	Seminars
	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%	a1,b1,b2,b3,c1,c4,d1
2	Practical exam	12	30	30%	a1,b1,b2,b3,c1,c4,d1
3	Final Exam	14	50	50%	a1,b1,b2,b3,c1,c4,d1
4					a1,b1,b2,b3,c1,c4,d1
	Total		100	100%	

Prepared by: Dr.Gamil Taher Abdul Mughni	Reviewed by: Prof. Dr. Khalid A. AL-Moyed	Head of the Department: Dr.Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr.Gamil Taher Abdul Mughni	Dean of College: Assistant prof. Dr. Ebtessam Al-Zabedi
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**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- Biostatistics: A Foundation for Analysis in the Health Sciences, 6th Edition by John P. Kleinbaum, Leslie L. Kupper, and Hal Morgenstern.
- 2- Epidemiology: Beyond the Basics, 2nd Edition by Moyses Szklo and F. Javier Nieto.

**2- Essential References.**

- 1- Maxcy-Rosenau (2010): Public health and preventive medicine, Prentice- Hall International Inc. 15th edition
- 2- o Park K. (2007) eighteenth edition: Environment and Health at Park's textbook of preventive and social medicine. Ms Banarsidas Bhanot, ., India.
- 3- o R. Beaglehole , R.Bonita and T Kjellström ( 2006): Basic Epidemiology .

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

- 1- International Journal of epidemiology
- 2- ECMA periodicals
- 3- www. Who. Int
- 4- www.cdc.org  
 www. BMJ.com  
 Centers for Disease Control and Prevention (.gov)  
 https://www.cdc.gov

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\Gamil Taher Abdul Mughni	Prof. Dr. Khalid A. AL-Moyed	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	Assistant Prof. Dr. Ebtisam Al-Zabedi



**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

Prepared by: Dr\Gamil Taher Abdul Mughni	Reviewed by: Prof. Dr. Khalid A. AL-Moyed	Head of the Department: Dr\Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr\Gamil Taher Abdul Mughni	Dean of College: Assistant prof. Dr. Ebtessam Al Zabedi
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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



الجمهورية اليمنية  
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 Microbiology  
Course No. (03.12. 311)  
2022/2023

Prepared by: - Assistant Prof/ Dr Ghannan Al-Tahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass.Pr. Dr. Ehtesam Al-Zabedi
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I. Course Identification and General Information:					
1	Course Title:	Advanced Molecular Microbiology			
2	Course Code & Number:	03.12. 311			
3	Credit Hours:	Theory Hours			
		Lecture	Exercise	Practical	Credit Hours
		2	0	2	3
4	Study Level/ Semester at which this Course is offered:	1st Level / 1st Semester			
5	Pre –Requisite (if any):	none			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Maste defee of MICROBIOLOGY & IMMUNOLOGY			
8	Language of Teaching the Course:	English			
9	Study System:	Semester			
10	Mode of Delivery:	Presentations and exercises			
11	Location of Teaching the Course:	University Campus			
12	Prepared by:	Dr Ghamdan Al-Tahish			
13	Date of Approval:	2022-2023			

Prepared by: - Assistant Prof. Dr Ghamdan Al-Tahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of Coliege: Ass.Pr. Dr. Ebtesam Al-Zabedi
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**II. Course Description:**

This course provides an in-depth study of the molecular biology of microorganisms. Topics include DNA replication, transcription, translation, regulation of gene expression, and molecular genetics of pathogens

**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	Understand the basic structure and function of microbial DNA, RNA, and proteins	A2
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**B. Intellectual Skills:**

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

b1	Explain the molecular basis of microbial pathogenesis gene expression	B1
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**C. Professional and Practical Skills:**

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

c1	Evaluate the use of molecular biology techniques in the diagnosis, treatment, and prevention of infectious diseases	C1
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**D. Transferable Skills:**

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

d1	Demonstrate oral and written effective communication skills	D2
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Prepared by: - Assistant Prof. Dr Ghaidan Al-Fahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass.Pr/Dr. Ebtesam Al-Zabedi
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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	<b>Understand</b> the basic structure and function of microbial DNA, RNA, and proteins	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>Explain</b> the molecular basis of microbial pathogenesis gene expression	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	<b>Evaluate</b> the use of molecular biology techniques in the diagnosis, treatment, and prevention of infectious diseases	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	<b>Demonstrate</b> oral and written effective communication skills	Lectures	Exam

Prepared by: - Assistant Prof. Dr Ghamdan Al-Tahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass. Prof. Dr. Ebtesam Al-Zabedi
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#### IV. Course Contents:

##### A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CLOs)
1	Introduction to molecular microbiology	<ul style="list-style-type: none"> <li>Basic molecular biology: Nucleic acid structure, denaturation and re-pairing of DNA</li> </ul>	1	2	a2,b2,c2,d 1
		<ul style="list-style-type: none"> <li>replication, transcription, translation, DNA damage, mutagenesis.....</li> </ul>			
2	Chromosome structure	<ul style="list-style-type: none"> <li>histone and DNA interactome; Structure and assembly of prokaryotic and eukaryotic DNA polymerases;...</li> </ul>	1	2	a2,b2,c2,d 1
3	DNA Replication and repair	<ul style="list-style-type: none"> <li>... Patterns of replication</li> <li>Initiation of replication</li> <li>Elongation of replication</li> <li>Termination of replication</li> <li>Proofreading and DNA repair</li> <li>Difference DNA replication</li> </ul>	1	2	a2,b2,c2,d 1
4	Gene structure	<ul style="list-style-type: none"> <li>Gene definition</li> <li>Gene structure</li> <li>Gene function</li> <li>Difference gene structure in prokaryotes and Eukaryotes</li> </ul>	1	2	a2,b2,c2,d 1
5	Gene expression-transcription	<ul style="list-style-type: none"> <li>Initiation of translation</li> <li>Elongation of translation</li> <li>Termination of translation</li> <li>mRNA processing (for eukaryotes)</li> </ul>			a2,b2,c2,d 1

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6	Gene expression-translation	<ul style="list-style-type: none"> <li>- Terminology: Cistrons, Coding Sequences and Open Reading Frames. genetic code, The Start Codon</li> <li>- Initiation of Translation</li> <li>- Elongation of Translation</li> <li>- Termination of Translation</li> </ul> <p>protein processing                      Control of gene expression at transcription and translation level                      of Regulation of gene expression in viruses, prokaryotic and eukaryotic genes,</p>			a2,b2,c2,d 1
7	mutation	<p>Definition                      Types of Mutations                      Gene Mutations.  <b>silent, missense, or nonsense mutations</b>  <b>frame shift mutations</b>                      Effects of gene mutations                      Chromosomal mutations and types                      Mutagens  <i>Teratogen:</i>                      Identification and selection of mutants; ...</p>	1		a2,b2,c2,d 1
8	DNA repair and recombination	<p><b>General classes of DNA damage</b>                      single base changes,                      structural distortion, and                      DNA backbone damage.                      Cellular response to DNA damage                      Recombination definition                      Types of Recombination                      Biological Roles for Recombination                      ...</p>	1		a2,b2,c2,d 1
9	Med term			2	a2,b2,c2,d

Prepared by: - Assistant Prof. Dr Ghandom Al Tahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass.Pr. Dr Ebtesam Al Zabedi
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					1
10	Bacterial genetics	Plasmids - types, replication, partitioning, copy-number control; Methods of gene transfer in Bacteria - Transformation: natural transformation systems. Transposable elements may be : Insertion sequence elements (IS) and  Transposons Phage genetics: lytic and lysogenic switch; Virulent and temperate phage. Transduction: Generalized and specialized transduction	1	2	a2,b2,c2,d 1
11	gene expression	Definition Types Regulation of Bacterial Gene Expression House keeping gene in bacteria Inductive and repressive gene expression Gene expression in Bacteriophage ...	1	2	a2,b2,c2,d 1
12	Recombinant DNA technology	Basics of Molecular Cloning Clone types DNA cloning definition Types. components process-application Cloning vectors types and Application2	1	2	a2,b2,c2,d 1
13	Microbial pathogenesis and host-pathogen interactions	Infection Process Virulence Factors Evading the Host Immune Response Evading the Host Immune	1	2	a2,b2,c2,d 1

Prepared by: - Assistant Prof. Dr. Ghamdan Al-Fahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass. Pr. Dr. Ebtessam Al-Zabedi
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		Response			
١٤	Antibiotic types	Types – structure Main classes –mode of action Members of each classes Antibiotic sensitivity testing methods	1	2	a2,b2,c2,d 1
١٥	Molecular mechanisms of antibiotic resistance	Types . mechanism and genes of resistance For beach class	1	2	a2,b2,c2,d 1
١٦	Final Theoretical Exam		1	2	
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,b3,b4,C1
2	Written Exams(MCQ)	A1,b3,b4,C1
3	Structured Oral Exams	A1,b3,b4,C1
4	Objective Structured Practical Exams (OSPE)	A1,b3,b4,C1
5	Student presentation	A1,b3,b4,C1

Prepared by: - Assistant Prof. Dr Ghamdan Al-Tahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass.Pr. Dr. Ebtisam Al-Zabedi
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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,b3,b4,C1
2	Activity	Throughout the semester	5	5%	A1,b3,b4,C1
3	Practical Report	Throughout the semester	10	10%	A1,b3,b4,C1
4	Practical exam	12	20	20%	A1,b3,b4,C1
5	Final Exam	14	50	50%	A1,b3,b4,C1
<b>Total</b>					

### Learning Resources:

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

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

Principles of Molecular Biology, 7th edition, by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter

Molecular Microbiology, 5th edition, by Christopher Davies

#### 2- Essential References.

Essential Molecular Biology, 4th edition, by Thomas D. Brock, Michael Madigan, John Martin, and Jack Parker

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

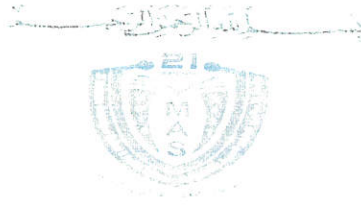
The American Society for Microbiology (ASM) website:

<https://www.asm.org/>

The National Center for Biotechnology Information (NCBI) website:

<https://www.ncbi.nlm.nih.gov/>

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



The European Molecular Biology Laboratory (EMBL) website:

<https://www.embl.de/>

**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
	<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.
3	<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.
	<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.
4	<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.
5	<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

Prepared by: - Assistant Prof. Dr Ghamdan Al-Tahish	Reviewed by: Dr Gamil Taher Abdul Mughni	Head of the Department: Dr Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr Gamil Taher Abdul Mughni	Dean of College: Ass.Pr. Dr. Ebtessam Al-Zabedi
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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 Virology  
Course No. (03.12.315)  
2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr. Dr. Ghamean Altahish	Dr. Gamil Taher Abdul Mughni	Dr. Gamil Taher Abdul Mughni	Dr. Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebrahim Z Abedi



I. Course Identification and General Information:				
1	Course Title:	Advanced Medical Virology		
2	Course Code & Number:	03.12.315		
3	Credit Hours:	Theory Hours		Credit Hours
		Lecture	Exercise	
		2	0	2
4	Study Level/ Semester at which this Course is offered:	1st Level / 2nd Semester		
5	Pre -Requisite (if any):	None		
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:	Regular		
11	Location of Teaching the Course:	University Campus		
12	Prepared by:	Prof. Dr. Khalid A. AL-Moyed		
13	Date of Approval:	2022-2023		

Prepared by: Dr. Dr. Ghannem Alfahish	Reviewed by: Dr\Gamil Taher Abdul Mughni	Head of the Department: Dr\Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr\Gamil Taher Abdul Mughni	Dean of College: - Associate Prof. Dr. Ehessan Ad-Zabedi
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	<b>A. II. Course Description:</b>
	This course provides an in-depth study of the major groups of viruses pathogenic for humans. Topics include virus replication, host range, pathogenesis, immunology, and epidemiology.

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

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
<b>A. Knowledge and Understanding:</b> <i>Upon successful completion of the course, students will be able to:</i>		
a1	Understand the basic structure and function of viruses, classification, morphological features of the different common human viral and fungal pathogens.	a1,a4,b1,b3,c2,d3
a2	Describe the pathogenicity, virulence factors and mode of transmission of the different common human viral pathogens	a1,a4,b1,b3,c2,d3
<b>B. Intellectual Skills:</b> <i>Upon successful completion of the course, students will be able to:</i>		
b1	Explain the replication cycle of viruses	a1,a4,b1,b3,c2,d3
b2	Design guidelines for prevention, treatment and control of infection/disease fo vial infection	a1,a4,b1,b3,c2,d3
<b>C. Professional and Practical Skills:</b> <i>Upon successful completion of the course, students will be able to:</i>		
c1	Identify the major groups of viruses that infect humans	a1,a4,b1,b3,c2,d3
<b>D. Transferable Skills:</b> <i>Upon successful completion of the course, students will be able to:</i>		
d1		a1,a4,b1,b3,c2,d3

Prepared by: Dr. Dr. Shandan Altafsh	Reviewed by: Dr/Gamil Taher Abdul Mughni	Head of the Department: Dr/Gamil Taher Abdul Mughni	Vice Dean for Quality affairs Dr/Gamil Taher Abdul Mughni	Dean of College: - Associate Prof. Dr. Etihann Al Zabedi
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C. 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 basic structure and function of viruses, classification, morphological features of the different common human viral and fungal pathogens.	Lectures	Exams
A2	Describe the pathogenicity, virulence factors and mode of transmission of the different common human viral pathogens.	Lectures	Exams
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
B1	Explain the replication cycle of viruses	Lectures Practical sessions	Exams, Assignments, Lab reports
B2	Design guidelines for prevention, treatment and control of infection/disease fo vial infection	Lectue	Exams, Assignments, Lab reports
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	Identify the major groups of viruses that infect humans	Lectures Practical sessions	Lab reports, Exams
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
D1			

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III. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	week	contact hours	Learning Outcomes
1	Introduction to Medical Virology	Definition viruses Describes the basic components of viruses,	1	2	a1,a4,b1,b 36,c2
2	Structure and Function of Viruses	- Structure and classification of viruses - Viral replication strategies - Viral genetics and variability - Host-virus interactions and immune response to viral infections	1	2	a1,a4,b1,b 36,c2
3	Virus Replication	Describe Virus isolation in cell cultures, Discuss the tem cytopathic effects and identification of viruses.	1	2	a1,a4,b1,b 36,c2
4	Host Range and Pathogenesis of Viral Infections	Mechanisms of viral pathogenesis - Viral tropism and tissue targeting - Immune evasion and viral persistence - Oncogenic viruses and cancer	1	2	a1,a4,b1,b 36,c2
5	Immunology of Viral Infections		1		a1,a4,b1,b 36,c2
6	Epidemiology of Viral Infection	- Principles of virus transmission - Outbreak investigation and control	1		a1,a4,b1,b 36,c2

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		- Epidemiology of viral infections - Emerging and re-emerging viral infections			
		- Laboratory diagnosis of viral infections - Antiviral therapies and drug resistance - Immunotherapy and passive immunization - Vaccine development and vaccination strategies		2	a1,a4,b1,b 36,c2
7	Diagnosis of viral infections Prevention and treatment of viral infections		1		
8	Viral Diseases of the Respiratory Tract	influenza, respiratory syncytial virus (RSV), parainfluenza virus, adenovirus, rhinovirus	1	2	a1,a4,b1,b 36,c2
9	Viral Diseases of the Gastrointestinal Tract	rotavirus, norovirus, hepatitis A virus, hepatitis B virus, hepatitis C virus, cytomegalovirus (CMV)	1	2	a1,a4,b1,b 36,c2
10	Viral Diseases of the Nervous System	poliomyelitis, herpes simplex virus (HSV), varicella-zoster virus (VZV), Epstein-Barr virus (EBV), HIV	1	2	a1,a4,b1,b 36,c2
11	Viral Diseases of the Skin	molluscum contagiosum, human papillomavirus (HPV), herpes zoster	1	2	a1,a4,b1,b 36,c2
12	Viral Diseases of the Blood	HIV, hepatitis B virus, hepatitis C virus	1	2	a1,a4,b1,b 36,c2
13	Viral diseases of the eyes:	herpes simplex virus (HSV), varicella-zoster virus (VZV),	1	2	a1,a4,b1,b 36,c2

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		cytomegalovirus (CMV)			
14	Final exam		1	2	a1,a4,b1,b36,c2
	Number of Weeks /and Units Per Semester		16	32	

B - Practical Aspect: (if any)				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to virology diagnostic techniques Electron microscope			a1,a4,b1,b36,c2
2	Cell culture			a1,a4,b1,b36,c2
3	Introduction to serological tests used in diagnosis of viral infections Agglutination and haemagglutination			a1,a4,b1,b36,c2,d3
4	Immunofluorescence			a1,a4,b1,b36,c2
5	Enzyme Linked Immune-sorbent Assay (ELISA)			a1,a4,b1,b36,c2
6	Other serological tests (complement fixation, radioimmunoassay (RIA), Western blot)			a1,a4,b1,b36,c2
7	Molecular diagnosis of viral infection.			a1,a4,b1,b36,c2
Number of Weeks /and Units Per Semester				

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

1-	Lectures
2-	Practical session
3-	Seminars
4	Dissscusion

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

No	Assignment
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.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
1	Midterm Exam	7	15	15%	a1,a4,b1,b36,c2
2	Activity	Throughout the semester	5	5%	a1,a4,b1,b36,c2
3	Practical Report	Throughout the semester	10	10%	a1,a4,b1,b36,c2
4	Practical exam	12	20	20%	a1,a4,b1,b36,c2
5	Final Exam	14	50	50%	a1,a4,b1,b36,c2
<b>Total</b>					

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### 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- Medical Virology, 9th Edition by David Knipe, Peter Palese, and David Roizman
- 2- "Medical Virology" by Frederick A. Murphy and E. Paul J. Gibbs Fifth Edition • 2016.

#### 2- Essential References.

- 1- "Fields Virology" edited 7th edition (April 17, 2020 by David M. Knipe and Peter M. Howley
- 2- "Virology: Molecular Biology and Pathogenesis" (2010). ASM Press by Leonard C. Norkin

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

- 1- Centers for Disease Control and Prevention (CDC)  
- <https://www.cdc.gov/vaccines/vpd/vpd-vac-basics.html>
- 2- World Health Organization (WHO)  
- <https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON303>
- 3- National Institute of Allergy and Infectious Diseases (NIAID)  
- <https://www.niaid.nih.gov/diseases>
- 4- Virology Education  
- <https://www.virology-education.com/>

### 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:**

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	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.
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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