Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory medicine..

Department of Biochemistry and Molecular biology

Course Specification of Advance Immunology

Course No. (03.11. 315)

2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
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I. Course Identification and General Information:

1	**Course Title:**	**Advance Immunology**			
2	**Course Code & Number:**	03.11. 315			
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:**	Master Degree Biochemistry and Molecular biology			
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:**				
13	**Date of Approval:**	2022-2023			

II. Course Description:

Advanced Immunology is provides an in-depth understanding of the immune system. The course covers a wide range of topics, including: The structure and function of the immune system, cellular and molecular mechanisms of immunity, Antigen processing and presentation, Tissue-specific immune responses,Immune-mediated pathologies and Vaccination

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	**Describe** the structure and function of the immune system.	**A2**
a2	**Discuss** the immune responses to infection, tumors, allergens, and autoimmunity	**a4**
B. Intellectual Skills: ***Upon successful completion of the course, students will be able to:***		
b1	**Explain** the cellular and molecular basis of immunity	B1
b2	**Illustrate** the immune responses damage and potential immunotherapy for the treatment of disease	**B2**
C. Professional and Practical Skills: ***Upon successful completion of the course, students will be able to:***		
c1	**Perform** different immunological diagnostic assay such as agglutination, precipitation, Enzyme-linked immunosorbent assay, Western blotting etc.	**C1**
c2	**Evaluate** the potential of immunotherapy for the treatment of disease	**C2**
D. Transferable Skills: ***Upon successful completion of the course, students will be able to:***		
d1	**Communicate** effectively about immunology to a variety of audiences	**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	**Describe** the structure and function of the immune system.	Lectures	Exam
	Discuss the immune responses to infection, tumors, allergens, and autoimmunity	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	**Explain** the cellular and molecular basis of immunity	Lectures	Exam
B2	**Illustrate** the immune responses damage and potential immunotherapy for the treatment of disease	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	**Perform** different immunological diagnostic assay such as agglutination, precipitation, Enzyme-linked immunosorbent assay, Western blotting etc.	Lectures, pactical	Exam pactical
C2	**Evaluate** the potential of immunotherapy for the treatment of disease	Lectures, pactical	Exam pactical

(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** effectively about immunology to a variety of audiences	Lectures	Exam

Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes
1	Introduction of Immunology	- eveiwe Historical background about the development of the discipline of immunology. -Definition immunology - Definition immunological terms. -Classification of immune system	1	2	a2,a4.b1,b2,c 1,c2,d3
2	Organs and Cells of the immune system	-Describe the organs, tissue, cells of the immune system - Cells innate immune response - Antigen presenting cells and large granular lymphocytes - Cells Adaptive immune response	1	2	a2,a4.b1,b2,c 1,c2,d3
3	Innate or Natural immunity	Definition 1-Components and functions of the natural immune defense system. -Differentiate between the main features of natural and adaptive immunity Recognize (PAR)	1	2	a2,a4.b1,b2,c 1,c2,d3
4	**Cellular defense mechanism** Phagocytosis, Cytotoxicity (NK cells) and inflammation	**-Definition** **-Type** **-Step** **-Mechanism of killing**	1	2	a2,a4.b1,b2,c 1,c2,d3
5	Antigens	**Definition** : Antigen Immunogen Adjuvant Hapten. – Types and properties of antigen,	1	2	a2,a4.b1,b2,c 1,c2,d3
6	**Complement system**	**-Definition** **-Properties** -Aactivation pathways:	1	2	a2,a4.b1,b2,c 1,c2,d3

		Classical Alternative lectin pathway. -Function **-Regulation**			
7	Med term exam		1		
8	Antibodies structural	**Definition** : Immunoglobulin (Ig) **Describe** the structure and function of the Immunoglobulin -**Evaluate** the components of Ig molecule in relation to its function. -Explain the components of Ig molecule and classification into classes and subclasses of Immunoglobulins. Illustrate the components of Ig which interaction with antigens , interaction with receptors on inflammatory cells and other molecules. Immunoglobulins in disease process.	1	2	a2,a4.b1,b2,c 1,c2,d3
9	Adaptive immunity:	Define Properties Cells mechanisms of humeral and cell-mediated immunity	3	2	a2,a4.b1,b2,c 1,c2,d3
10	Humoral	Define Properties Cells T-dependent T- independent in the activation of B lymphocytes. Describe the transformation of activated B cells into plasma cells. recognize that plasma cells are the cells that synthesize Immunoglobulins (antibodies). describe the control mechanism of antibody mediated response.	1	2	a2,a4.b1,b2,c 1,c2,d3

		know techniques of Immunoglobulins measurement			
11	cellular	Define Properties Cells understand the activation of different T lymphocyte subpopulations and subsets. Compare T Cell Receptor (TCR) and B Cell Receptor (BCR) to show similarity and dissimilarity in relation to function. To describe the mechanism of cytotoxicity by cytotoxic T lymphocyte (CTL) and other cell. To understand the control mechanism of CMI response.	2	6	a2,a4.b1,b2,c 1,c2,d3
12	Cytokine	-Definition the different terms for cytokines nomenclature. -Classification and function of different cytokines. -Mode of action and effects on immune functions. -chmokinyes function. -role of cytokines in health and disease.	1	2	a2,a4.b1,b2,c 1,c2,d3
13	Vaccines	-Difine -Type -	1	2	a2,a4.b1,b2,c 1,c2,d3
14	Final exam		1	2	
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 of Antigen-Antibody Interactions and Immunodiagnostic**			a2,a4.b1,b2,c1,c2,d3
2	**Immuno-agglutination technique**			a2,a4.b1,b2,c1,c2,d3
3	**Precipitation technique**			a2,a4.b1,b2,c1,c2,d3
4	**ELISA technique**			a2,a4.b1,b2,c1,c2,d3
5	**Serodiagnosis of Hepatitis B Virus and Hepatitis C Virus.**			a2,a4.b1,b2,c1,c2,d3
Number of Weeks /and Units Per Semester				

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**	a2,a4.b1,b2,c1,c2,d3
2	Written Exams(MCQ)	a2,a4.b1,b2,c1,c2,d3
3	Structured Oral Exams	a2,a4.b1,b2,c1,c2,d3
4	Objective Structured Practical Exams (OSPE)	a2,a4.b1,b2,c1,c2,d3
5	Student presentation	a2,a4.b1,b2,c1,c2,d3

VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
1	**Midterm Exam**	7	15	15%	a2,a4.b1,b2,c1,c2,d3
2	**Activity**	Throughout the semester	5	5%	a2,a4.b1,b2,c1,c2,d3
3	Practical Report	Throughout the semester	10	10 %	a2,a4.b1,b2,c1,c2,d3
4	**Practical exam**	12	20	20%	a2,a4.b1,b2,c1,c2,d3
5	**Final Exam**	14	50	50%	a2,a4.b1,b2,c1,c2,d3
Total					

Learning Resources:

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

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

1- lecture note
2- Kuby Immunology, 10th Edition,2019:Jenni Punt; Sharon Stranford; Patricia Jones; Judy Owen

2- Essential References.

1-Roitt's Essential Immunology, 13th Edition. 13thEdition, Peter J. Delves et al., Wiley-Blackwell, 2017.
2-Cellular and Molecular Immunology 10th edition, Abul K. Abbas, ELSVIEVER, 2021.

3- Electronic Materials and Web Sites *etc*.

1- https://www.youtube.com/results?search_query=Dr.+Saleh+Bahaj
2-https://onlinelearning.hms.harvard.edu/hmx/courses/immunology/
3- https://www.edx.org/learn/immunology
4- https://onlinelearning.hms.harvard.edu/hmx/courses/hmx-immunology/
-https://immunology.utoronto.ca/online-learning

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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 assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**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.
7	**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