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** 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	**Identify** and assess causal relationships between exposures and outcomes	Lecture	Exam
B2	**Design** 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	**Interpret** the results of statistical analyses	Lecture Discussion Presentation	Exam Discussion Presentation
C2	**Perform** statistical software to analyze data	Lecture Discussion Presentation	Exam Discussion Presentation
(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 Discussion Presentation	Exam Discussion Presentation
	Apply ethical and legal principles to the use of epidemiologic data	Lecture Discussion Presentation	Exam Discussion Presentation

V. Course Content:

A – Theoretical Aspect:

NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	introduction to statistics AND basic statistical concepts	- Overview of biostatistics and epidemiology - Data types and measurement scales - Sampling and bias - Study designs in epidemiology	1	2	a1,b1,b2, b3,c1,c4, d1
2	Descriptive study	Measures of central tendency Measures of dispersion	2	4	
3	Estimation of population	Parametric tests and non-parametric tests, variables, variance			
4	Linear Regression Analysis	- Simple linear regression - Multiple linear regression - Model selection and assumptions - Generalized linear models	2	4	a1,b1,b2, b3,c1,c4, d1
5	Logistic Regression Analysis (	- Binary logistic regression - Multinomial and ordinal logistic regression - Model selection and interpretation - Goodness-of-fit and diagnostics	1	2	a1,b1,b2, b3,c1,c4, d1
8	MED TERM		1	2	a1,b1,b2, b3,c1,c4, d1
9	Introduction to epidemiologic methods	Definition Important	1	2	a1,b1,b2, b3,c1,c4, d1
10	**Descriptive epidemiology**:	Distribution of diseases in populations. measures of disease frequency incidence prevalence methods for describing the distribution of disease in space and time.	3	6	a1,b1,b2, b3,c1,c4, d1
11	**Analytic epidemiology**:	methods for assessing the association between exposures and outcomes, and for	3	6	a1,b1,b2, b3,c1,c4,

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

XI. *Course Policies:*	
1	**Class Attendance:**
	-If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
2	**Tardy:**

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
- Dr. Ebtesam Mahdi Al-Zabedi	Dr\ DrNawal Al-Henhena	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

	- If the student is late for the lectures for the 2nd time, he will not be allowed to attend this lecture
3	Exam Attendance/Punctuality:
	- If any student does not attend the exam in the scheduled day, it will consider as a fail for him
4	**Assignments & Projects:**
	- Any student dose not submithis assignment,he will lose its grade.
5	**Cheating:** - 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	**Plagiarism:**
	- 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	**Other policies:**
	- Undelivered requirement will not be marked
	- You should leave your dental Chair as clean as possible

Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory medicine.

Department of Hematology
Course Specification of Cellular and Molecular Biology
Course No. (03.13. 317)
2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
- Dr. Nabil Alowiri	Dr\ Nawal Al-Henhena	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

I. Course Identification and General Information:					
1	**Course Title:**	Cellular and Molecular Biology			
2	**Course Code & Number:**	03.13. 317			
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 Medical Diagnostic Hematology			
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. Nabil Alowiri			
13	**Date of Approval:**	2023			

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
- Dr. Nabil Alowiri	Dr\ Nawal Al-Henhena	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

II. Course Description:

This course provides an introduction to the principles and techniques of molecular biology and genetics. Topics covered include DNA structure and replication, gene expression, regulation of gene expression, DNA repair, mutagenesis, cloning, and genetic engineering.

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 principles of molecular biology and genetics	A1
a2	**Describe** the different methods of molecular cloning and different methods of genetic engineering	A2
B. Intellectual Skills: *Upon successful completion of the course, students will be able to:*		
b1	**Design** and carry out molecular biology and genetic experiments	B1
C. Professional and Practical Skills: *Upon successful completion of the course, students will be able to:*		
c1	**Isolate and purify** DNA and RNA from different sources, check of purity of isolated DNA and RNA, restriction fragmentation and separation of oligos by agarose electrophoresis, RAPD analysis of DNA, cDNA synthesis using PCR, Southern and Northern blotting experiments.	C1
D. Transferable Skills: *Upon successful completion of the course, students will be able to:*		
d1	**Demonstrate** oral and written effective communication skills	

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
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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 principles of molecular genetics and genetic disorders	Lectures	Exams
A2	**Discuss** the genetic variation and genetic diseases, drugs that act on the membrane	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	**Design** and carry out molecular genetic experiments	Lectures	Exams, Assignments
(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	**Isolate and purify** DNA and RNA from different sources, check of purity of isolated DNA and RNA, restriction fragmentation and separation of oligos by agarose electrophoresis, RAPD analysis of DNA, cDNA synthesis using PCR, Southern and Northern blotting experiments.	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	**Demonstrate** oral and written effective communication skills	Lectures Practical sessions	Lab reports, Exams

NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction to Cell	- An overview of the cell and cell structure - Membrane biology - Major cell functions - Regulation of cell functions	1	2	a1,a2,b1,c1,d1
2	Nucleic acids	- Types of nucleic acids - DNA structure and function - RNA structure, types, and function	1	2	a1,a2,b1,c1,d1
3	Genome organization: from nucleotides to chromatin	- Eukaryotic genome - Bacterial genome and Plasmids - Bacteriophages and mammalian DNA viruses - Mitochondrial genome - Definition of a gene, gene structure, chromosomal organization of genes and noncoding DNA	1	2	a1,a2,b1,c1,d1
4	DNA replication	- Models of replication - Initiation of replication - Elongation of replication - Termination of replication - Proofreading of DNA - DNA replication in prokaryotes and Eukaryotes	1	2	a1,a2,b1,c1,d1
5	Gene expression - Transcription	- Transcription in prokaryotes and eukaryotes - Regulatory region and transcriptional unit of Gene - Inhibitors of transcription - Reverse transcription. - Post-transcriptional processing of RNA: splicing, cap addition and polyadenylation - Polynucleotide phosphorylase.	1	2	a1,a2,b1,c1,d1
6	Gene expression	- General features of the genetic code	1	2	a1,a2,b1,c1,d1

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	- **Translation and Post-translational modifications**	- Ribosome as the site of protein synthesis - Activation of amino acids - Initiation, elongation and termination of protein synthesis in prokaryotes and eukaryotes - Fidelity of protein synthesis - Bioenergetics of protein synthesis - Control of translation. - Post-translational processing of the polypeptide chains - Acylation, methylation, phosphorylation and glycosylation.			
7	**DNA repair and mutations**	- General classes of DNA damage - Mechanisms of DNA repair - Types of mutations and their phenotypic consequences	1	2	a1,a2,b1,c1,d1
8	Molecular biology techniques - Analysis of Individual DNA and RNA Sequences	- Molecular Cloning - Restriction Enzymes - Vectors - Plasmids - Libraries - Screening Libraries with Nucleic Acid - Probes	2	4	a1,a2,b1,c1,d1
9	Molecular biology techniques - **Methods of Nucleic Acid Analysis and Proteins**	- Southern Blotting - Northern or RNA Blotting - Western Blot Analysis of Proteins	1	2	a1,a2,b1,c1,d1
10	Molecular biology techniques - **The Polymerase Chain Reaction (PCR)**	- Conventional PCR - Modifications of PCR method - RT-PCR - Gel Electrophoresis - Real time PCR (qPCR) - Primers and primer Design - Applications of PCR	2	2	a1,a2,b1,c1,d1
11	Molecular biology techniques	- Introduction - Sequencing Methods and	2	4	a1,a2,b1,c1,d1

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	- **DNA Sequence Analysis**	Terminology - Sanger Sequencing - Second/Next Generation Sequencing - Pyrosequencing -			
12	Molecular biology techniques - **Advanced Techniques**	- Fluorescence in Situ Hybridization - Comparative Genome Hybridization - RNA Expression Arrays	1	2	**a1,a2,b1,c1,d1**
13	**Final 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**	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)
2	Activity	Throughout the semester	20	20%	a2,a4.b1,b2,c1,c2,d3
5	Final Exam		80	80%	a2,a4.b1,b2,c1,c2,d3
Total			100		

Learning Resources:

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

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

Lizabeth A. Allison – 2007 - Textbook of Fundamental molecular biology - Blackwell Publishing Ltd

2- Essential References.

1- WILLIAM B. COLEMAN and GREGORY J. TSONGALIS – 2010 - MOLECULAR DIAGNOSTICS – SECOND EDITION - SPRINGER NEW YORK DORDRECHT HEIDELBERG LONDON
2- Asklepios Bratislava – 2010 - INTRODUCTION TO MEDICAL AND MOLECULAR BIOLOGY -

3- Electronic Materials and Web Sites *etc.*

1- Harvard Molecular & Cellular Biology
2- Kimball's Biology Pages
3- Genetic Engineering and Biotechnology News

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.

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
- Dr. Nabil Alowiri	Dr\ Nawal Al-Henhena	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

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

Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory medicine..

Department of Hematology
Course Specification of Advanced Immunohematology and Blood Transfusion

Course No. (03.13. 316)

2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\Gamil Taher Abdul Mughni	- Dr. Abdulrahman Amer	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

I. Course Identification and General Information:					
1	**Course Title:**	Advanced Immunohematology and Blood Transfusion			
2	**Course Code & Number:**	03.13. 316			
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			

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\Gamil Taher Abdul Mughni	- Dr. Abdulrahman Amer	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

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**

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\Gamil Taher Abdul Mughni	- Dr. Abdulrahman Amer	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

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,c1,c 2,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,c1,c 2,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,c1,c 2,d3
4	**Cellular defense mechanism** Phagocytosis, Cytotoxicity (NK cells) and inflammation	**-Definition** **-Type** **-Step** **-Mechanism of killing**	1	2	a2,a4.b1,b2,c1,c 2,d3
5	Antigens	**Definition** : Antigen Immunogen Adjuvant Hapten. – Types and properties of antigen,	1	2	a2,a4.b1,b2,c1,c 2,d3
6	Complement system	**-Definition** **-Properties** -Aactivation pathways:	1	2	a2,a4.b1,b2,c1,c 2,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,c1,c 2,d3
9	Adaptive immunity:	Define Properties Cells mechanisms of humeral and cell-mediated immunity	3	2	a2,a4.b1,b2,c1,c 2,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,c1,c 2,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,c1,c 2,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,c1,c 2,d3
13	Vaccines	-Difine -Type -	1	2	a2,a4.b1,b2,c1,c 2,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

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
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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

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr\Gamil Taher Abdul Mughni	- Dr. Abdulrahman Amer	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

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

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Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory medicine..

Department of Hematology

Course Specification of Advanced Diagnostic Hematology

Course No. (03.13.315)

2022/2023

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
. Dr Fuad Balkan	- Dr. Abdulrahman Amer	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

I. Course Identification and General Information:					
1	**Course Title:**	Advanced Diagnostic Hematology			
2	**Course Code & Number:**	03.13.315			
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 Medical Diagnostic Hematology			
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			

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
. Dr Fuad Balkam	- Dr. Abdulrahman Kader	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

II. Course Description:
This course provides an in-depth look at the diagnosis of hematologic disorders. Topics covered include the interpretation of blood cell counts, peripheral blood smears, bone marrow biopsies, and other diagnostic tests. Students will also learn about the role of molecular diagnostics in the diagnosis of hematologic disorders

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 pathophysiology of hematologic disorders	a1
B. Intellectual Skills: **Upon successful completion of the course, students will be able to:**		
b1	**Interpret and Explain** result of blood cell counts, peripheral blood smears, bone marrow biopsies	b1
C. Professional and Practical Skills: **Upon successful completion of the course, students will be able to:**		
c1	**Interpret**, verify and validate results and report findings to the requesting clinician.	c1
D. Transferable Skills: **Upon successful completion of the course, students will be able to:**		
d1	**Communicated** effectively through oral presentational, computer procession and presentation and written report	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	Describe the pathophysiology of hematologic disorders	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	**Interpret and Explain** result of blood cell counts, peripheral blood smears, bone marrow biopsies	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	**Interpret**, verify and validate results and report findings to the requesting clinician.	Lecture Discussion Presentation	Exam Discussion Presentation
(D Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	**Communicated** effectively through oral presentational, computer procession and presentation and written report	Lecture Discussion Presentation	Exam Discussion Presentation

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Course Content:					
A – Theoretical Aspect:					
Order	**Units/Topics List**	**Sub Topics List**	Number of Weeks	**contact hours**	**Learning Outcomes**
1	Complete blood count (CBC)		2	4	a1,b1,c1,d1
2	Red blood cell indices		3	6	a1,b1,c1,d1
3	White blood cell differential		1	2	a1,b1,c1,d1
4	Platelet count		3	6	a1,b1,c1,d1
5	Peripheral blood smears		2	4	a1,b1,c1,d1
	Bone marrow biopsies		2	4	a1,b1,c1,d1
7	Coagulation studies		1	2	a1,b1,c1,d1
8	Other diagnostic tests for hematologic disorders	Flow cytometer Immunohistochemistry Molecular diagnostics	1	2	a1,b1,c1,d1
9	Peripheral blood smear Bone marrow biopsy	interpretation Differential diagnosis	1	2	a1,b1,c1,d1
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 discussion**
	Case study analysis

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VI. Assessment Methods of the Course:	
No	**Assignment**
1	**Written Exams (Essays) and Quizzes**
2	Structured Oral Exams
4	Objective Structured Practical Exams (OSPE)
5	Student presentation
6	Case study analysis

VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
2	**Activity**	Throughout the semester	10	10%	a1,b1,c1,d1
3	Practical Report	Throughout the semester	10	10 %	a1,b1,c1,d1
4	**Practical exam**	12	20	20%	a1,b1,c1,d1
5	**Final Exam**	14	60	60%	a1,b1,c1,d1
Total					

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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-	Basic Principles and Practice , 2017 by Ronald Hoffman et al.
2-	Williams Hematology ,2010 ,by Kenneth Kaushansky et al.
2- Essential References.	
1-	Clinical Hematology, Theory and Procedures by Mary Louise Turgeon 2018 .
2-	Hematology: Principles and Practice, 9th Edition by Kenneth Kaushansky, Michael Greaves, and Richard Aster
3- Electronic Materials and Web Sites *etc*.	
1-	The American Society of Hematology website www.hematology.org
2-	The National Institutes of Health, National Heart, Lung, and Blood Institute Website www.nhlbi.nih.gov
3-	The World Health Organization website (www.who.int)
4-	The Centers for Disease Control and Prevention website (www.cdc.gov)
	Medscape Hematology (www.medscape.com/hematology)
	Blood Journal (www.bloodjournal.org)