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 Genetics of Hematology
Course No. (03.13. 321)
2022/2023

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
Dr\ Nawal Al- Henhena	Dr\ Nabil Alowiri	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 genetics of hematology			
2	**Course Code & Number:**	03.13. 321			
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 / 2nd 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\ Nawal Al- Henhena			
13	**Date of Approval:**	2022-2023			

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

II. Course Description:
This course is designed to provide advanced knowledge and understanding of the molecular genetic basis of hematological disorders. Students will learn about the latest research and advancements in the field of molecular genetic hematology, including the identification and characterization of genetic mutations that contribute to the development and progression of hematological 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	**Understand** the molecular genetic basis of hematological disorders, including the identification and characterization of genetic mutations that contribute to the development and progression of hematological disorders	A1
B. Intellectual Skills: ***Upon successful completion of the course, students will be able to:***		
b1	**Analyze** the interplay between genetic and environmental factors in the pathogenesis of hematological disorders.	B1
C. Professional and Practical Skills: ***Upon successful completion of the course, students will be able to:***		
c1	**Evaluated** research plan based on the latest research and advancements in the field	C1
D. Transferable Skills: ***Upon successful completion of the course, students will be able to:***		
d1	**Communicate** effectively about hematological disorders to patients, colleagues, and the public	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	**Understand** the molecular genetic basis of hematological disorders, including the identification and characterization of genetic mutations that contribute to the development and progression of hematological 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	**Analyze** the interplay between genetic and environmental factors in the pathogenesis of hematological disorders.	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	**Evaluated** research plan based on the latest research and advancements in the field	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** effectively about hematological disorders to patients, colleagues, and the public	Lecture Discussion Presentation	Exam Discussion Presentation

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
Dr\ Nawal Al- Henhena	Dr\ Nabil Alowini	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to Molecular Genetic Hematology:	Basic concepts and definitions, history of molecular genetic hematology, and overview of the course.	2	4	a1,b1,c3,d1
2	The Genetics of Hematological Disorders	○ Mendelian inheritance ○ Chromosomal disorders	1	2	a1,b1,c3,d1
3	Hematopoiesis and Hematopoietic Stem Cells:	Mechanisms of hematopoiesis, regulation of hematopoietic stem cells, and their role in the development of hematological disorders.	2	4	a1,b1,c3,d1
4	Genetic Basis of Hematological Disorders:	Role of genetic mutations in the development and progression of hematological disorders, including anemias, leukemias, lymphomas, and myeloproliferative disorders.	1	2	a1,b1,c3,d1
5	Inherited Hematological Disorders:	Molecular basis of inherited hematological disorders, including thalassemia, sickle cell anemia, and hemophilia.	2	4	a1,b1,c3,d1
6	Acquired Hematological Disorders:	Molecular basis of acquired hematological disorders, including myelodysplastic syndromes and	2	4	a1,b1,c3,d1

		myeloproliferative neoplasms.			
7	Epigenetics and Hematological Disorders:	Role of epigenetic modifications in the development and progression of hematological disorders.	1	2	a1,b1,c3,d1
8	Hematological Oncogenomics:	Applications of genomics and transcriptomics in the study of hematological disorders, including identification of new therapeutic targets and development of personalized medicine.	1	2	a1,b1,c3,d1
9	Hematological Immunology:	Role of the immune system in the pathogenesis of hematological disorders, including autoimmune hemolytic anemia and immune thrombocytopenia.	1	2	a1,b1,c3,d1
10	Stem Cell Transplantation:	Role of stem cell transplantation in the treatment of hematological disorders, including allogeneic and autologous stem cell transplantation.	1	2	a1,b1,c3,d1
11	Research and Developments in Molecular Genetic Hematology:	Current research and developments in the field of molecular genetic hematology, including new tools, technologies, and approaches.	1	2	a1,b1,c3,d1
12	Final exam		1	2	a1,b1,c3,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

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,a2,b1,c3,d1
3	Practical Report	Throughout the semester	10	10 %	a1,a2,b1,c3,d1
4	**Practical exam**	12	20	20%	a1,a2,b1,c3,d1
5	**Final Exam**	14	60	60%	a1,a2,b1,c3,d1
Total					

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

Learning Resources:
• *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*
1- Required Textbook(s) (maximum two).
Clinical Biochemistry: An Integrated Approach, 7th Edition by William M. Brown and David A. Marks Clinical Chemistry: A Laboratory Handbook, 7th Edition by John W. Baynes and Michael J. Dominiczak
2- Essential References.
Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 6th Edition by Burt Hirschhorn and Robert A. McPherson Devlin's Textbook of Biochemistry with Clinical Correlations: Martin D. Snider John Wiley & Sons, Incorporated, Oct 9, 2024 - 1448 pages
Web
1- http://www.biology.arizona.edu/biochemistry/biochemistry.html
2- **GENERAL BIOCHEMISTRY:** http://web.indstate.edu:80/thcme/mwking/
3- **MEDICAL BIOCHEMISTRY** http://www.kumc.edu/research/medicine/biochemistry/bioc800/opening.html
4- https://pubmed.ncbi.nlm.nih.gov/

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:**

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
Dr\ Nawal Al- Henhena	Dr\ Nabil Alowin	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

	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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21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory Medicine.

Department of Hematology
Course Specification of **Advanced Biochemistry**
Course No. (03.13.320)
2022 /2023

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

I. Course Identification and General Information:					
1	**Course Title:**	Advanced Biochemistry			
2	**Course Code & Number:**	**03.11.320**			
3	**Credit Hours:**	**Theory Hours**			
		Lecture	**Exercise**	Practical	**Credit Hours**
		2	0	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:**	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:**	Dr. Nawal AL-Henhena			
13	**Date of Approval:**	2023			

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

II. Course Description:

The focus is on the regulation of sugar and fat metabolism in eukaryotes, with an emphasis on human. The course will begin with a review of carbohydrate and lipid metabolic pathways, particularly pathway integration and regulation. We will then progress to an in-depth analysis of current research in specific areas of sensing, signaling and metabolic regulation.

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** knowledge and understanding of the principles of the regulation and integration of macromolecules metabolic pathways and signal transduction	A1
B. Intellectual Skills: *Upon successful completion of the course, students will be able to:*		
b1	**Explain** the metabolic pathways and signal transduction relation to diseases	B2
C. Professional and Practical Skills: *Upon successful completion of the course, students will be able to:*		
c1	**Apply** theoretical and practical aspects of mechanisms of regulation.	C1
D. Transferable Skills: *Upon successful completion of the course, students will be able to:*		

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

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	**Demonstrate** knowledge and understanding of the principles of the regulation and integration of macromolecules metabolic pathways and signal transduction s	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 metabolic pathways and signal transduction relation to diseases	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	**Apply** theoretical and practical aspects of mechanisms of regulation.	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

NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	**Metabolism of carbohydrates** **Metabolism of lipids** **Metabolism of proteins**	Glycolysis ,Krebs's cycle , B-oxidation, ketogenesis and cholesterol metabolism, Amino acid metabolism, Urea cycle,		12	**a1,,b1,c1**
2	**Regulation of metabolism**	Regulation of carbohydrates metabolism in muscles, adipose tissues and liver Regulation of lipid metabolism in adipose tissues and liver Regulation of protein metabolism and nucleic acid	2	2	**a1,,b1,c1**
3	**Metabolic integration**	The co-ordination between three metabolites (carbohydrates, lipid, and proteins). Cellular Respiration	2	4	**a1,,b1,c1**
4	**Inborn Errors of Metabolism**	Diseases enzymes and genes, defects in enzyme synthesis, genetic heterogeneity, pathogenic mechanism in inherited metabolic diseases, diagnosis of inherited metabolic diseases	3	6	**a1,,b1,c1**
5	**Molecular aspects of signal transduction**	Signaling mediated-processes; Intracellular receptors (steroid hormones), cell-surface receptors (cAMP and calcium).	2	4	**a1,,b1,c1**
6	**Regulation of cAMP concentration by hormones**	Adenylate cyclase, phosphodiesterase, G-protein, mechanism of action of cAMP, specificity of cAMP-dependent protein kinase, structure and mechanism of action of the protein kinase	1	2	**a1,,b1,c1**
7	**Final Exam**		1	2	**a1, b1,c1**
Number of Weeks /and Units Per Semester			16	32	

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

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**	
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)
2	**Activity**	Throughout the semester	20	20%	a1,,b1,c1
5	**Final Exam**		80	80%	a1,,b1,c1
Total			**100**		

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

Learning Resources:

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

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

Devlin, T.M., John Wiley & Sons, (2011) , Biochemistry with Clinical Correlations -7th ed., Inc. (New York), ISBN: 978-0-470-28173-4.

2- Essential References.

1- Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman and Company (New York), ISBN:13: 978-1-4641-0962-1 / ISBN:10:1-4292-3414- 8.
2- Nelson, D.L. and Cox, M.M. Lehninger Principles of Biochemistry (8th Edition, 2021).

3- Electronic Materials and Web Sites *etc.*

1- Metabolism – clinicaland Experimental: https://metabolismjournal.com
2- The World Health Organization (WHO): https://www.who.int/

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

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

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
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Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS &

APPLIEED SCIENCES

Faculty of Laboratory medicine..

Department of Hematology

Course Specification of Research Methodology

Course No. (03.13. 319)

2022/2023

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
- Dr. Ebtesam Mahdi Al-Zabedi	. Dr Ghamdan Al-Tahish	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:**	Research Methodology			
2	**Course Code & Number:**	03.13. 319			
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. Ebtesam Mahdi Al-Zabedi	. Dr Ghamdan Al-Tahish	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam Al-Zabedi

II. Course Description:
This course will introduce students to the principles of research methodology and biostatistics. Students will learn how to design and conduct research studies, collect and analyze data, and interpret the results of statistical analyses. The course is designed for students who are interested in pursuing a career in research, control, or teaching related to health sciences

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** specialized research methods and data collection	**a1**
B. Intellectual Skills: *Upon successful completion of the course, students will be able to:*		
b1	**Design** advanced research project autonomously synthesizing the various ethical, statistical, and reporting methods	**b1**
C. Professional and Practical Skills: *Upon successful completion of the course, students will be able to:*		
c1	**Demonstrate** mastery in advanced research methods when write clear and concise research reports.	**c1**
c2	**Applied** advanced ethical issues in research	**c3**
D. Transferable Skills: *Upon successful completion of the course, students will be able to:*		
d1	**Communicate** effectively about Research Methods and Scientific Writing to a variety of audiences	**D1**

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
- Dr. Ebtesam Mahdi Al-Zabedi	Dr Ghamdan Al-Tahish	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
a 1	**Understand** specialized research methods and data collection	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	**Design** advanced research project autonomously synthesizing the various ethical, statistical, and reporting methods	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	**Demonstrate** mastery in advanced research methods when write clear and concise research reports.	Lecture Discussion Presentation	Exam Discussion Presentation
C2	**Applied** advanced ethical issues in research	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** effectively about Research Methods and Scientific Writing to a variety of audiences	Lecture Discussion Presentation	Exam Discussion Presentation

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

Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes
1	Introduction to Biostatistics and Research Methodology	•Definitions •Meaning of Descriptive and Inferential Statistics •Population and Sample •Types of Variable •Measurement Scales •Measurement Errors	2	4	a1,b1,c1,c3,d1
2	Presentation of Data	•Presenting data by graphs and tables •Box Plots •Sources of Data	2	4	a1,b1,c1,c3,d1
3	Measure of Central Tendency • Definition of Average and its types	• Definition of Average and its types • A.M, G.M, H.M, Median and Mode • Quantiles • Properties of Mean • Relative merits and Demerits of These averages	2	4	a1,b1,c1,c3,d1
4	Measure of Dispersion	• Absolute and Relative Dispersion • Range • Quartile Deviation • Mean Deviation • Variance • Standard Deviation • Skewness • Kurtosis	1	2	a1,b1,c1,c3,d1

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		• Practicing Exercise (Testing & Numerical)			
5	Probability	Random Experiments Sample Space and Events Different Definitions of Probability	1	2	a1,b1,c1,c3,d1
6	Simple Regression and Correlation	• Regression and Correlation definitions and interpretation • Scatter Diagram • Least Square Method Coefficient of Determination	3	6	a1,b1,c1,c3,d1
7	Sampling	• Definition • Sampling Design and Sampling Frame • Probability and Non-Probability Sampling • Sampling and Non-Sampling Errors • Sampling Distribution of Mean and Variance • Difference of Means	1	2	a1,b1,c1,c3,d1
8	Hypothesis Testing	• Definition • Null and Alternative Hypothesis • Critical region • Type I and Type II error • Level of Significance • P-Value and power of test • Acceptance and Rejection Regions Chi-square, Z-Test and T-Test	3	6	a1,b1,c1,c3,d1
9	Analysis of Variance and Experimental	Analysis of Variance of One-Way and Two- Way Complete Randomized	1	2	a1,b1,c1,c3,d1

Prepared by:	Reviewed by:	Heamatolgy Department Charge D'affairs	Vice Dean for Quality affairs	Dean of College:
- Dr. Ebtesam Mahdi Al-Zabedi	. Dr Ghamdan Al-Tahish	Dr\Gamil Taher Abdul Mughari	Dr\Gamil Taher Abdul Mughari	- Associate Prof. Dr. Ebtesam Al-Zabedi

	~~Design~~	~~Randomized Complete Block~~ Latin Square Design Factorial Experiments			
10	Screening	•Reliability and Validity of a Screening Test •Sensitivity and Specificity •Predictive values	1	2	a1,b1,c1,c3,d1
11	Final exam		1	2	a1,b1,c1,c3,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

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

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

VII. Assignments:

No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
2	**Activity**	Throughout the semester	10	10%	a1,a2,b1,c3,d1
3	Practical Report	Throughout the semester	10	10 %	a1,a2,b1,c3,d1
4	**Practical exam**	12	20	20%	a1,a2,b1,c3,d1
5	**Final Exam**	14	60	60%	a1,a2,b1,c3,d1
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-Robert R. Pagano., 2009 (9th Edition). Study guide understanding Statistics in the Behavioral Sciences. Cengage Learning.
2-Chap T. Le., 2003 (2nd Edition). Introductory Biostatistics. John Wiley & Sons, Inc.

2- Essential References.

1-Indrayan A. and Malhotra R. K., 2012 (3rd Edition). Medical Biostatistics. CRC Press.
2-Qiu, P., 2013 (2nd Edition). Introduction to statistical process control. Chapman and Hall/CRC.

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3-Waqar H Kazmi and Farida Habib Khan., 2014 (1st Edition) Basics in Epidemiology and Biostatistics (Jaypee Publishers)
Wep
4- https://pubmed.ncbi.nlm.nih.gov/

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:**

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	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 Biomedical Statistics & Epidemiology

Course No. (03,13,318)

2022/2023

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

I. Course Identification and General Information:

1	**Course Title:**	Biomedical Statistics & Epidemiology			
2	**Course Code & Number:**	03,13,318			
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:**	- Associate Prof. Dr. Ebtesam Al-Zabedi			
13	**Date of Approval:**	2022-2023			

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
- Dr. Ebtesam Mahdi Al-Zabedi	Dr\ DrNawal Al-Henhona	Dr\Gamil Taher Abdul Mughni	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtesam 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**
B. Intellectual Skills: ***Upon successful completion of the course, students will be able to:***		
b1	**Interpret and explain** appropriate statistical methods to analyze data	**B1**
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	**Perform** statistical software to analyze data	**C3**
D. Transferable Skills: ***Upon successful completion of the course, students will be able to:***		
d1	Communicate the results of statistical analyses to others	**D1**