



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 Leukemia
Course No. (03,03,342)

2022/2023



I. Course Identification and General Information:					
1	Course Title:	Leukemia			
2	Course Code & Number:	03,03,342			
3	Credit Hours:	Theory Hours			
		Lecture	Exercise	Practical	Credit Hours
		2	0	2	3
4	Study Level/ Semester at which this Course is offered:	Fourth Level / 2 nd Semester			
5	Prerequisite (if any):	Hematology			
6	Co –Requisite (if any):	None			
7	Program (s) in which the course is offered:	Bachelor in laboratory medicine			
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. Boshra Al-absi			
13	Date of Approval:	2023/3/11			

II. Course Objectives and Learning Outcomes (description, objective, course learning outcome)	
A. Course Description:	
This course focuses on the definition, causes, pathophysiology, clinical features, and	



laboratory diagnosis of white blood cells disorders.

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:		
a1	Define leukemia and identify causes, pathophysiology, clinical features, and laboratory diagnosis of leukemia.	A1
a2	Describe morphological and aetiologic classification of leukemia, differential diagnosis of leukemia.	A2
B. Intellectual Skills: Upon successful completion of the course, students will be able to:		
b1	Perform laboratory techniques used in diagnosis of leukemia, blood film morphological assessment of different types of leukemia.	B2
b2	Recognize errors or discrepancies in lab results.	B2
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:		
c1	Demonstrate ethical and professional behavior, interest, enthusiasm, and willingness to learn as seen through active participation.	C1, C3
D. Transferable Skills: Upon successful completion of the course, students will be able to:		
d1	Related causes, pathophysiology, clinical feature and laboratory diagnosis of different types of white blood cell disorders	D1

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	Define leukemia and identify causes, pathophysiology, clinical features, and laboratory diagnosis of leukemia.	<ul style="list-style-type: none"> Interactive lectures Discussion Self-learning Presentation 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes). Final oral exam Assignment:



		Case study (CBL)	
a2	Describe morphological and aetiologic classification of leukemia, differential diagnosis of leukemia.	<ul style="list-style-type: none"> Interactive lectures Discussion Self-learning Presentation Case study (CBL) 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes). Final oral exam Assignment:
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	Perform laboratory techniques used in diagnosis of leukemia, blood film morphological assessment of different types of leukemia..	<ul style="list-style-type: none"> Interactive lectures Discussion Self-learning Presentation Case study (CBL) 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes). Final oral exam Assignment:
b2	Recognize errors or discrepancies in lab results.	<ul style="list-style-type: none"> Interactive lectures Discussion Self-learning Presentation Case study (CBL) 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes). Final oral exam Assignment:
(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 ethical and professional behavior, interest, enthusiasm, and willingness to learn as seen through active participation.	<ul style="list-style-type: none"> Practical session Training 	<ul style="list-style-type: none"> Written exam (mid and final terms and quizzes). Final practical exam Final oral exam Assignment:
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	Related causes, pathophysiology, clinical feature and laboratory diagnosis	<ul style="list-style-type: none"> Seminars 	<ul style="list-style-type: none"> Assignment:



of different types of white blood cell disorders	<ul style="list-style-type: none"> • Discussion • Case study (CBL) 	<ul style="list-style-type: none"> - Research - Homework - Team work
--	--	---

IV. Course Content:

A – Theoretical Aspect:

NO.	Units/Topics List	Sub-topics List	Number of Weeks	Contact hours	Learning Outcomes (CILOs)
1	introduction into WBC disorders: definition, types, function and classification of WBC disorders		1	2	a1, b1
2	Benign quantitative WBC disorders	Leukocytosis, neutrophilia, eosinophilia, basophilic leukocytosis, monocytosis, lymphocytosis, leukopenia, neutropenia and lymphopenia	1	2	a1, b1
3	Benign qualitative WBC disorders: morphological changes of WBCs and functional defects		1	2	a2, b1
4	Hematological malignancies	Definition, classification, incidence, cell cycle, apoptosis, risk factors, genetic abnormalities associated with hematological	1	2	a2, b2
5	Leukemia: definition, classification, incidence, pathogenesis, methods of diagnosis		1	2	a1, b1,



6	Mid-term exam		1	1	
7	Acute myeloid leukemia (AML	Classification and subtypes, clinical and laboratory features, treatment and prognosis	1	2	a2.a1
8	Acute lymphoid leukemia (ALL	classification and subtypes, clinical and laboratory features, treatment and prognosis, Differential diagnosis between AML and ALL	1	2	a2,
9	Chronic myeloid leukemia (CML	classification and subtypes, clinical and laboratory features, treatment and prognosis	1	2	b1,
10	Chronic lymphoid leukemia (CLL	classification and subtypes, clinical and laboratory features, treatment and prognosis	1	2	a2, b1,
11	Myelodysplastic syndrome: classification and subtypes, clinical and laboratory features, treatment and prognosis		1	2	a2,
12	Hodgkin lymphoma	classification and subtypes, clinical and laboratory features, treatment and prognosis	1	2	a2, b1
13	Non- Hodgkin lymphoma	Classification and subtypes, clinical and laboratory features, treatment and prognosis	1	2	a2,
14	Final Theoretical				a1,a2, b1,b2
	Number of Weeks /and Units Per Semester		14	25	



B - Practical Aspect: (if any)

NO.	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1	Laboratory test of WBC: total WBC count, differential count, Interpretation of results	1	2	c1
2	Normal leucopoiesis stages: microscopic pictures.	1	2	c1



3	Diagnosis of leukemia: CBC, bone marrow examination, cytochemical stains, flow cytometry, chromosomal analysis	1	2	c2,d1
4	Diagnosis of AML: CBC, bone marrow examination, cytochemical stains, flow cytometry, chromosomal analysis	1	2	c1,d1
5	Diagnosis of ALL: CBC, bone marrow examination, cytochemical stains, flow cytometry, chromosomal analysis	1	2	c1
6	Diagnosis of CML: CBC, bone marrow examination. cytochemical stains, flow cytometry, chromosomal analysis	1	2	c1
7	Diagnosis of chronic eosinophilic leukemia and chronic neutrophilic leukemia	1	2	c1
8	Diagnosis of CLL: CBC, bone marrow examination. cytochemical stains, flow cytometry, chromosomal analysis	1	2	c1
9	Final practical exam	1	2	c1
Number of Weeks /and Units Per Semester		9	18	

V. Teaching Strategies of the Course:

1-	Lectures:
2-	practical session
3-	Seminars

VI. Assessment Methods of the Course:

No	Assignment
1	<ul style="list-style-type: none"> Written Exams (Short Essays) and Quizzes
2	<ul style="list-style-type: none"> Multiple Choice Questions (MCQ)
3	<ul style="list-style-type: none"> Practical Exams (PE)



4	<ul style="list-style-type: none"> • Assignment: <ul style="list-style-type: none"> - Research - Homework - Team work
---	--

VII. Assignments:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	<ul style="list-style-type: none"> • Assignment: <ul style="list-style-type: none"> - Research - Homework - Team work 		5	5%	d 1
2	Midterm Exam	8	15	15%	a1,a2,b1,b2
3	Practical exam	14	30	30%	c1
4	Final Exam	16	50	50%	a1,a2,b1,b2,
	Total	100		100%	

VIII. Learning Resources:	
1- Required Textbook(s) .	
1-	A. Victor Hoffbrand- 2016- Hoffbrand's Essential Hematology- Seventh edition
2-	Dacie and Lewis Practical Haematology, Twelfth Edition • 2017.
	Barbra j.Bain ,Imel...Elsevier (2017)
2- Essential References.	
1-	Shirlyn McKenzie, Kristin Landis-Piwowar, Linne Williams (2019). Clinical Laboratory Hematology, 4th Edition, Pearson Publishers. ISBN-13: 978-0134709390; ISBN-10: 013470939X
3- Electronic Materials and Web Sites etc.	



1-	https://www.britannica.com/science/blood-biochemistry
2-	https://en.wikipedia.org/wiki/Blood
3-	https://pubmed.ncbi.nlm.nih.gov/?term=blood
4-	https://www.britannica.com/science/blood-biochemistry

IX. Course Policies:

Class Attendance:	
1	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.
Tardiness:	
2	-If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
Exam Attendance/Punctuality:	
3	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.
Assignments & Projects:	
4	Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
Cheating:	
5	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.
Forgery and Impersonation:	
6	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.
Other policies:	
7	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