Faculty of Laboratory medicine

All Departments

Course Specification of General Chemistry

Course No. ( )

2025 /2024

I. Course Identification and General Information:

1	**Course Title:**	General Chemistry			
2	**Course Code & Number:**	----			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	1^{st} Level / 1^{st} Semester			
5	**Pre –Requisite (if any):**	non			
6	**Co –Requisite (if any):**	**Practical General and Organic Chemistry**			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**				
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. Ahmed Ali Ahmed AL-Hazmi			
13	**Date of Approval:**	2025			

II. Course Description:

This course aims to clarify the basic principles and concepts of chemistry, including the properties of matter, atomic structure, the periodic table, and the hierarchy of properties within it. It also provides an introduction to the electronic configuration of atoms and types of chemical bonds. It also provides an introduction to organic chemistry to establish the theoretical foundations for what the student will study in future advanced courses. The student will complete practical course to acquire practical skills.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر) II. Intended learning outcomes (ILOs) of the course:	**Referenced PILOs (مخرجات تعلم البرنامج)**
A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:	

a.1	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure, state of matter and Basic concepts of chemical bonding.	**A1**	Recognize the principles of physical, chemical, behavioral, and chemistry science.
a.2	Demonstrate the basic concepts of, solutions and acidity and basicity.		
a.3	Recognize the basic principles of organic chemistry.		
a.4	Recognize the importance of chemistry to laboratory medicine		
a.5	Classify chemical reactions and differentiate the bonding types, atomic structure.		
a.6	Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons and its derivatives		
a.7	Select the suitable methods for identification of organic compounds in accordance with the physical and chemical properties of functional groups		
a.8	Distinguish between acids and bases and operate different equipment used in the lab		
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Classify chemical reactions according to their rates and energy	**B1**	Consolidate the chemical, and physiological principles to construct the pharmacophores of the structure and their effect
b2	Predict structure, bonding and trends in the behavior of matter using the atomic theory.		
b3	Differentiate the bonding types, atomic structure, and organic compounds nomenclature, synthesis, reactions.	**B2**	Categorize the organic compounds and carrying out the calculations in chemistry
b4	Distinguish between acids and bases and ability of doing calculation in chemistry.		
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c.1	Operate different chemistry equipment's and instruments and use emerging technologies in design, synthesis, pre-formulation, formulation, packaging, storage and analysis of matter	**C1**	Identify salts and organic compounds from their physical and chemical properties
c.2	Conduct research studies and utilize the results in different laboratory medicine chemistry fields..	**C2**	Handle chemicals according to safety guidelines
c3	Handle and dispose chemicals and preparations including safely and effectively.	**C3**	Operate different equipment and instruments in the lab.
D. Transferable Skills: Upon successful completion of the course, students will be able to:			
d1	Communicate and cooperate effectively with his colleagues and other specialist.	**D1**	Apply information and communication technology and working effectively in a team.

d2	Demonstrate creativity and time management.	**D2**	Develop financial, , writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.
d3	Use the principle rules to solve problem and questions related to the course.		

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a.1	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure, state of matter and Basic concepts of chemical bonding.	Lecture, seminars , method, group discussion, and tutorial	Quizzes, written exam (MCQ/Essay questions), assignments , participation, reports, homework, and written exam
a.2	Demonstrate the basic concepts of, solutions and acidity and basicity.		
a.3	Recognize the basic principles of organic chemistry.		
a.4	Recognize the importance of chemistry to laboratory medicine.		
a.5	Classify chemical reactions and differentiate the bonding types, atomic structure.		
a.6	Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons and its derivatives		
a.7	Select the suitable methods for identification of organic compounds in accordance with the physical and chemical properties of functional groups.		
a8	Distinguish between acids and bases and Operate different equipment used in the lab		
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1	Classify chemical reactions according to their rates and energy.	Small group activities, Lecture method, Computer based teaching and Problem solving sessions,	Oral exams, assignments, interpretative exercises.
b2	Predict structure, bonding and trends in the behavior of matter using the atomic theory.		
b3	Differentiate the bonding types, atomic structure, and organic compounds nomenclature, synthesis, reactions.		
b.4	Distinguish between acids and bases and ability of doing calculation in chemistry		
(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**

c1	Operate different chemistry equipment's and instruments and use emerging technologies in design, synthesis, formulation, packaging, storage and analysis of matter	Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2	Conduct research studies and utilize the results in different laboratory medicine chemistry fields..		
c.3	Handle and dispose chemicals and preparations including safely and effectively.		

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Communicate and cooperate effectively with his colleagues and other specialist.	Small group discussions, discussion and practical classes .	Homework, and reports.
d2	Demonstrate creativity and time management.		
d3	Use the principle rules to solve problem and questions related to the course.		

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Course introduction	The study of chemistry, important of chemistry in laboratory medicine and applied science.	1	2	a1-a2, d1-d3
2	Definitions, of matter	Definitions, classification of matter, properties of matter, separation methods, types of changes, quantities, units and measurements, analysis dimension	1	2	a1-a2, d1-d3
3	Atoms , molecules and ions	Atomic theory of matter, electronic configuration, modern atomic structure, ions, ion compounds, molecules, chemical formulas, inorganic nomenclatures, binary compounds nomenclature,	1	2	a1-a2, b1-b3, d1-d3
4	Stoichiometry, calculations based on balanced chemical equations	Chemical equations, reaction types, mole concepts, empirical and molecular formulas calculations, quantitative information based on balanced chemical equations, limiting reagent, calculation of atoms, molecules, moles, equivalents and yield percentage	2	4	a1-a2, b1-b3, d1-d3
5	Mid-term exam	Mid-term exam	1	2	a1-a4, b1-b3,

6	Introduction to organic chemistry	Definition, important of organic chemistry, characteristic of carbon in organic chemistry, factors affecting on physical properties of organic compound, polarity, hydrogen bonding, polar and non-polar covalent bonds, classification of organic compounds based on functional group isomerization, nucleophilicity and basicity hybridization.	1	2	a3,a6-a8, d1-d3 , b1 ,b2 d1-d3
7	Alkanes, cycloalkanes, alkenes and alkynes	Definition, structure, physical properties, nomenclature, uses, synthesis and chemical reactions	2	4	a3, a6-a8, d1-d3, b1 ,b2
8	Aromatic compound, benzene	Aromatic character, Huckel rule, Nomenclature,.	1	2	a3,a6-a8, d1-d3 , b1 ,b2
9	Aromatic compound, benzene	Electrophilic aromatic substitution reactions (Alkylation, halogenations, acylations, nitration, sulphonation) Orientation in monosubstituted and disubstituted benzenes derivatives	2	4	a3,a6-a8, d1-d3 , b1 ,b2
10	Alkyl halide, alcohols,	Definition, structure, physical properties, nomenclature, uses, synthesis and chemical reactions	1	2	a3,a6-a8, d1-d3 , b1 ,b2
11	Oxygenic Compounds aldehyde, **ketones and carboxylic acid**	Definition, structure, physical properties, nomenclature, uses, synthesis and chemical reactions	2	4	a3,a6-a8, d1-d3 , b1 ,b2
12	**Final-term exam**	Final-term exam	1	2	
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments and Subtopics List**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	Lab. Safety instructions Instructions of lab working, , knowing apparatus, reagents. introduction to practical course	1	2	**c1-c2, d1-d3**
2	Identification of 1st group acid radicals Identification tests of carbonate, bicarbonate and sulphide	2	4	**c1-c3, d1-d3**
3	Identification of 2nd group acid radicals: Identification tests of chloride, iodide and nitrates acid radicals	2	4	**c1-c2, d1-d3**
4	Identification of third group acid radicals: Identification tests of sulfate, borate and phosphates acid radicals	1	2	**c1-c3, d1-d3**
5	Identification of 1st and 2nd group basic radicals and Flame tests :Identification tests of silver, lead and, cupric, , mercuric ,iron and flame tests of calcium, barium, strontium, sodium, potassium basic radicals	1	2	**c2, d1-3**

6	Practical Mid-Term Exam	1	2	**c1-c3, d1-d3**
7	Scheme of identification of unknown simple salt (Different unknown simple salts)	1	2	**c1-c3, d1-d3**
8	Identification of alcohols :tests of methanol, ethanol and glycerol	1	2	**c1-3, d1-3**
9	Identification of aldehydes and ketones : tests of formaldehyde, acetaldehyde and acetones	1	2	**c1-c3, d1-d3**
10	Identification of liquid carboxylic acid :tests of formic and acetic acid	2	4	**c2, d1-3**
11	Scheme of identification of unknown liquid organic compound: Identification of different unknown simple organic compounds	1	2	**c2, d1-3**
12	Final Exam	1	2	
Number of Weeks /and Units Per Semester		**15**	**30**	

C. Tutorial Aspect:

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	NA			

V. Teaching Strategies of the Course:

Lectures for knowledge and understanding including computer-based teaching and learning group discussion, brainstorming and Problem solving. sessions**,** tutorial, Practical sessions and group discussion

VI. Assessment Methods of the Course:

Written examination by the end of the semester

Practical examination by the end of the semester

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Homework Assignments	12		Sporadic through the semester
2	Reports	12		Sporadic through the semester
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance, Participation, reports and quizzes ,oral tests and homework assignments	All weeks	10	10%	a1,a3,a4,b1,b4, d1-3

3	**Practical mid- semester exam , attendance, participation and reports**	7th	15	15%	a1,a3,a4,b1,b4, d1-3
4	**Theoretical mid-semester exam**	6th	15	15%	a1-5, b1, b2, b3
5	Final Exam (practical)	**15th**	15	15%	a1-5, b1-4
6	Final Exam (theoretical)	**16th**	45	45%	c1-2, d1-3
Total			**100**	**100%**	

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

1- Jerry and March,. 2007,. Advanced Organic Chemistry ; reaction, mechanism and structure, 6th edition, John Wiley & Sons, Inc., Hoboken, New Jersey

2- J. W. Solomon's, 2008 "Organic Chemistry" 9th Ed., John Wiley, New York.

2- Essential References:

J.D. Brady, 2000, General Chemistry Principles & Structures, 7th Edition, John Wiley & Sons, New York

3- Electronic Materials and Web Sites etc.:

http://www.orgsyn.org/.

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي

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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Second Part of Course Specification

Faculty of Laboratory Medicine

All Departments

2023/2022م

Course Plan (Syllabus) of First Aid

Course No. (…….)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	**Ahmed Ali Ahmed AL-Hazmi**						
Location& Telephone No.:	**+96777181994**						
E-mail:	**Alhazmidrahmed40@gmail.com**	SAT	SUN	MON	TUE	WED	THU
Office Hours							

2023/2022م

I. Course Identification and General Information:					
	Course Title:	**General Chemistry**			
2	**Course Code & Number:**				
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	

		3	2		1
4	**Study Level/ Semester at which this Course is offered:**	1^{st} Level / 1^{st} Semester			
5	**Pre –Requisite (if any):**	non			
6	**Co –Requisite (if any):**	**Practical General and Organic Chemistry**			
7	**Program (s) in which the Course is Offered:**	Bachelor of laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**				
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. Ahmed Ali Ahmed AL-Hazmi			
13	**Date of Approval:**	2024-2025			

II. Course Description:

This course aims to clarify the basic principles and concepts of chemistry, including the properties of matter, atomic structure, the periodic table, and the hierarchy of properties within it. It also provides an introduction to the electronic configuration of atoms and types of chemical bonds. It also provides an introduction to organic chemistry to establish the theoretical foundations for what the student will study in future advanced courses. The student will complete practical course to acquire practical skills.

III. Course Intended Learning Outcomes (CILOs) :(مخرجات تعلم المقرر)

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:

a1	Recognize Atoms, Molecules, Ions, compounds, Atomic and Electronic Structure, state of matter and Basic concepts of chemical bonding.
a2	Demonstrate the basic concepts of, solutions and acidity and basicity.
a3	Recognize the basic principles of organic chemistry.
a4	Recognize the importance of chemistry to laboratory medicine.
a5	Classify chemical reactions and differentiate the bonding types, atomic structure.
a6	Illustrate the classification, IUPAC nomenclature, physical, chemical properties, preparation and reactions of hydrocarbons and its derivatives
a7	Select the suitable methods for identification of organic compounds in accordance with the

	physical and chemical properties of functional groups.
a8	Distinguish between acids and bases and Operate different equipment used in the lab
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Classify chemical reactions according to their rates and energy.
b2	Predict structure, bonding and trends in the behavior of matter using the atomic theory.
b3	Differentiate the bonding types, atomic structure, and organic compounds nomenclature, synthesis, reactions.
b4	Distinguish between acids and bases and ability of doing calculation in chemistry
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Operate different chemistry equipment's and instruments and use emerging technologies in design, synthesis, formulation, packaging, storage and analysis of matter .
c2	Conduct research studies and utilize the results in different laboratory medicine chemistry fields.
c3	Handle and dispose chemicals and preparations including safely and effectively
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Communicate and cooperate effectively with his colleagues and other specialist.
d2	Demonstrate creativity and time management.
d3	Use the principle rules to solve problem and questions related to the course.

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Course introduction	The study of chemistry, important of chemistry in laboratory medicine and applied science.	1	2
2	definitions, of matter	definitions, classification of matter, properties of matter, separation methods, types of changes, quantities, units and measurements, analysis dimension	1	2
3	Atoms , molecules and ions	Atomic theory of matter, electronic configuration, modern atomic structure, ions, ion compounds, molecules, chemical formulas, inorganic nomenclatures, binary compounds nomenclature,	1	2
4	Stoichiometry , calculations based on balanced chemical equations	Chemical equations, reaction types, mole concepts, empirical and molecular formulas calculations, quantitative information based on balanced chemical equations, limiting reagent, calculation of atoms, molecules, moles, equivalents and yield percentage	2	4
5	Mid-term exam	Mid-term exam	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
6	Introduction to organic chemistry	Definition, important of organic chemistry, characteristic of carbon in organic chemistry, factors affecting on physical properties of organic compound, polarity, hydrogen bonding, polar and non-polar covalent bonds, classification of organic compounds based on functional group isomerization nucleophilicity and basicity hybridization.	1	2
7	Alkanes, cycloalkanes, alkenes and alkynes	Definition, structure, physical properties, nomenclature, uses, synthesis and chemical reactions	2	4
8	Aromatic compound, benzene	Aromatic character, Huckel rule, Nomenclature,.	1	2
9	Aromatic compound, benzene	Electrophilic aromatic substitution reactions (Alkylation, halogenations, alcylations, nitration, sulphonation) Orientation in monosubstituted and disubstituted benzenes derivatives	2	4
10	Alkyl halide, alcohols,	Definition, structure, physical properties, nomenclature, uses, synthesis and chemical reactions	1	2
11	Oxygenic Compounds aldehyde, **ketones and carboxylic acid**	Definition, structure, physical properties, nomenclature, uses, synthesis and chemical reactions	2	4
12	**Final-term exam**	Final-term exam	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

No.	Tasks/ Experiments and Subtopics List	Number of Weeks	Contact Hours
1	Lab. Safety instructions Instructions of lab working, , knowing apparatus, reagents. introduction to practical course	1	2
2	Identification of 1st group acid radicals Identification tests of carbonate, bicarbonate and sulphide	2	4
3	Identification of 2nd group acid radicals: Identification tests of chloride, iodide and nitrates acid radicals	2	4
4	Identification of third group acid radicals: Identification tests of sulfate, borate and phosphates acid radicals	1	2
5	Identification of 1st and 2nd group basic radicals and Flame tests :Identification tests of silver, lead and, cupric, , mercuric ,iron and flame tests of calcium, barium, strontium, sodium, potassium basic radicals	1	2
6	Scheme of identification of unknown simple salt (Different unknown simple salts)	1	2

No.	Tasks/ Experiments and Subtopics List	Number of Weeks	Contact Hours
7	Practical Mid-Term Exam	1	2
8	Identification of alcohols :tests of methanol, ethanol and glycerol	1	2
9	Identification of aldehydes and ketones : tests of formaldehyde, acetaldehyde and acetones	1	2
10	Identification of liquid carboxylic acid :tests of formic and acetic acid	2	4
11	Scheme of identification of unknown liquid organic compound: Identification of different unknown simple organic compounds	1	2
12	Final Exam	1	2
Number of Weeks /and Units Per Semester		**15**	**30**

No.	Tutorial	Number of Weeks	Contact Hours
1		1	2
2		2	4
3		2	4
4		1	2
5		1	2
6		1	2
7		1	2
8		1	2
9		1	2
10		2	4
11		1	2
12		1	2
Number of Weeks /and Units Per Semester		**15**	**30**

V. Teaching Strategies of the Course:

Lectures for knowledge and understanding including computer-based teaching and learning group discussion, brainstorming and Problem solving. sessions**,** tutorial, Practical sessions and group discussion

VI. Assessment Methods of the Course:

Written examination by the end of the semester

Practical examination by the end of the semester

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Homework Assignments	12		Sporadic through the semester
2	Reports	12		Sporadic through the semester
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance, Participation, reports and quizzes ,oral tests and homework assignments	All weeks	10	10%	a1,a3,a4,b1,b4, d1-3
3	**Practical mid- semester exam , attendance, participation and reports**	All weeks 7th	15	15%	a1,a3,a4,b1,b4, d1-3
4	**Theoretical mid-semester exam**	8th	15	15%	a1-5, b1, b2, b3
5	Final Exam (practical)	**15th**	15	15%	a1-5, b1-4
6	Final Exam (theoretical)	**16th**	45	45%	c1-2, d1-3
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2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

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.
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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.

Faculty of Laboratory Medicine

Course Specification of

Analytical Chemistry

Course No. ( )

2025/2024م

I. Course Identification and General Information:

1	**Course Title:**	Analytical chemistry			
2	**Course Code & Number:**				
3	**Credit Hours/weak:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	1st Level / 2nd Semester			
5	**Pre –Requisite (if any):**	General Chemistry			
6	**Co –Requisite (if any):**	NONE			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Face to Face lecture and Lab. groups			
11	**Location of Teaching the Course:**	University Campus & Laboratories			
12	**Prepared by:**	Dr. Ahmed Ali Alhazmi			
13	**Date of Approval:**				

II. Course Description:

This course aims to provide students with essential knowledge of analytical chemistry principles and their applications in laboratory medicine. It covers analytical errors, solution preparation, and concentration calculations, chemical equilibria, volumetric and electrochemical analysis, spectrophotometric, techniques, and basic chromatographic principles. The course emphasizes analytical reasoning, accurate data interpretation, and the application of analytical methods relevant to professional laboratory practice.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)		**Referenced PILOs (مخرجات تعلم البرنامج)**	
B. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
a1	Explain the fundamental principles of	**A1**	**Demonstrate understanding of the**

	analytical chemistry and the types of qualitative and quantitative analysis used in laboratory medicine. A1		**fundamental knowledge of biomedical and applied medical sciences relevant to the specialty.**
a2	Describe sources of analytical errors, concepts of accuracy and precision, and methods of analytical data treatment. A1	**A2**	**Demonstrate knowledge of the anatomical and functional structure of the human body at the molecular, cellular, organ, and biochemical levels across different stages of life.**
a3	Explain chemical equilibrium concepts including solubility, pH, buffer solutions, and their relevance to analytical chemistry. A1	**A3**	**Demonstrate knowledge of the various causes of diseases—genetic, congenital, immunological, environmental, and others—and how these factors interact in the development and spread of disease.**
a4	Describe the basic principles of volumetric, electrochemical, and spectrophotometric analytical methods applied in medical laboratories. A1, A2	**A4**	**Demonstrate knowledge of the ethical and legal principles of the profession and the medicolegal aspects related to professional practice and errors.**
		A5	**Demonstrate knowledge of the principles and fundamentals of sterilization, infection control, and contamination prevention in accordance with internationally recognized standards.**
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Analyze analytical data and evaluate laboratory results in terms of accuracy and reliability. B1	**B1**	**Interpret laboratory medical results efficiently and professionally and identify technical errors.**
b2	Compare different analytical methods and select the most appropriate method based on sample type and analytical purpose. B3	**B2**	**Evaluate and solve community health problems using the scientific approach in research.**
b3	Solve numerical problems related to solution concentrations, titrations, and spectrophotometric analysis accurately. B1	**B3**	**Select appropriate diagnostic tools for each case while considering cost and clinical relevance.**
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Apply basic laboratory techniques for preparing standard solutions and performing volumetric titrations according to standard procedures. C2	**C1**	**Implement quality management systems and biosafety procedures in laboratory practice.**
c2	Use basic analytical instruments such as spectrophotometers in compliance with	**C2**	**Apply technical skills in operating laboratory devices, instruments, and**

	laboratory safety and quality requirements. C1, C2		**materials.**
c3	Adhere to biosafety, quality control, and laboratory safety guidelines during analytical experiments. C1	**C3**	**Collect, transport, preserve, and store specimens according to standard operating procedures.**
		C4	**Use various methods to diagnose biochemical, hematological, immunological, microbiological, parasitic, and pathological diseases.**
		C5	**Apply standard procedures in blood bank services and transfusion practices.**
D. Transferable Skills: Upon successful completion of the course, students will be able to:			
d1	Document and report analytical results in written form using appropriate scientific terminology. D3	**D1**	**Conduct research projects in the field of laboratory medicine with a sense of social responsibility.**
d2	Work effectively as a member of a laboratory team and demonstrate professional responsibility. D2	**D2**	**D2 Participate harmoniously in teamwork and demonstrate collaboration with colleagues and other healthcare professionals.**
d3	Use basic computer skills to process, analyze, and present analytical data. D5	**D3**	**Document and communicate effectively using appropriate scientific language, both orally and in writing.**
d4	Demonstrate self-directed learning skills and continuous professional development in analytical chemistry.D6	**D4**	**Provide medical services to low-income individuals and those unable to afford treatment, especially in emergencies.**
		D5	**Use computer, information, and communication technology skills effectively; analyze, interpret, and present statistical data.**
		D6	**Engage in continuous education and lifelong learning.**
		D7	**Work effectively under challenging conditions such as crises and epidemics.**

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a1	Explain the fundamental principles of analytical chemistry and the types of qualitative and quantitative analysis used in	▪ Interactive lectures ▪ Group work ▪ multimedia presentations	▪ Quizzes ▪ midterm exam ▪ final exam

	laboratory medicine. A1	▪ guided discussions	
a2	Describe sources of analytical errors, concepts of accuracy and precision, and methods of analytical data treatment. A1	▪ Interactive lectures ▪ Group work ▪ multimedia presentations ▪ guided discussions	▪ Quizzes ▪ midterm exam ▪ final exam
a3	Explain chemical equilibrium concepts including solubility, pH, buffer solutions, and their relevance to analytical chemistry. A1	▪ Interactive lectures ▪ Group work ▪ multimedia presentations ▪ guided discussions	▪ Quizzes ▪ midterm exam ▪ final exam
a4	Describe the basic principles of volumetric,electrochemical, and spectrophotometric analytical methods applied in medical laboratories. A1, A2	▪ Interactive lectures ▪ Group work ▪ multimedia presentations ▪ guided discussions	▪ Quizzes ▪ midterm exam ▪ final exam

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Analyze analytical data and evaluate laboratory results in terms of accuracy and reliability. B1	▪ Interactive lectures ▪ Group work ▪ guided discussions\ ▪ application-based discussions	▪ Quizzes ▪ Home work ▪ midterm exam ▪ final exam
b2	Compare different analytical methods and select the most appropriate method based on sample type and analytical purpose. B3	▪ Interactive lectures ▪ Group work ▪ guided discussions\ ▪ application-based discussions	▪ Quizzes ▪ Home work ▪ midterm exam ▪ final exam
b3	Solve numerical problems related to solution concentrations, titrations, and spectrophotometric analysis accurately. B1	▪ Interactive lectures ▪ Group work ▪ guided discussions\ ▪ application-based discussions	▪ Quizzes ▪ Home work ▪ midterm exam ▪ final exam

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Apply basic laboratory techniques for preparing standard solutions and	▪ Group working ▪ Hands-on	▪ Observation checklist

	performing volumetric titrations according to standard procedures. C2	laboratory sessions ▪ Practical show	▪ Practical exam ▪ Written exam
c2	Use basic analytical instruments such as spectrophotometers in compliance with laboratory safety and quality requirements. C1, C2	▪ Group working ▪ Hands-on laboratory sessions ▪ Practical show	▪ Observation checklist ▪ Practical exam ▪ Written exam
c3	Adhere to biosafety, quality control, and laboratory safety guidelines during analytical experiments. C1	▪ Group working ▪ Hands-on laboratory sessions ▪ Practical show	▪ Observation checklist ▪ Practical exam ▪ Written exam

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Document and report analytical results in written form using appropriate scientific terminology. D3	▪ Self-learning ▪ Group activities	▪ Instructor observation ▪ Group evaluation
d2	Work effectively as a member of a laboratory team and demonstrate professional responsibility. D2	▪ Self-learning ▪ Group activities	▪ Instructor observation ▪ Group evaluation
d3	Use basic computer skills to process, analyze, and present analytical data. D5	▪ Self-learning ▪ Group activities	▪ Instructor observation ▪ Group evaluation
d4	Demonstrate self-directed learning skills and continuous professional development in analytical chemistry.D6	▪ Self-learning ▪ Group activities	▪ Instructor observation ▪ Group evaluation

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Introduction**	Definitions, importance, types of analytical chemistry. Qualitative and quantitative analysis, the mole calculations	1	2	a1
2	**Analytical**	Units, errors and its reasons, types and handling analysis data (precision and	2	2	a2, b1

	Errors	accuracy). Solutions and their types			
3	**Concentration of solutions**	(Molarity, Normality, and Molality) and physical method (w/w% , w/v% and v/v%), ppm and ppt	3	2	a2, b3
4	**…**	Solubility , solubility constant, and precipitate formation and factors affecting of precipitation and solubility	4	2	a3
5	**Problems**	Solving numerical problems about previous lessons	5	2	b3
6	**Titrations**	Acid and base (strong and weak), pH calculations of theirs and buffer solutions .introduction to titration methods	6	2	a3, b3
7	**Titrations**	Acid base titrations (types and plot titration curve according pH value	7	2	a4, b2
8	**Mid-Term Theoretical Exam**		8	2	All above
9	**Titrations**	Redox titration , balance redox equations in different media and Nernst's equations and plot titration curve according E value	9	2	a4, b2
10	**Instrumental analysis**	Electrode potential ,types of half-cell, standard hydrogen electrode , galvanic cells , Faraday's law in electrical analysis	10	2	a4, b2
11	**Practice**	Solving numerical problems about previous lessons	11	2	b3
12	**Instrumental analysis**	Spectrophotometry:, absorption and emission, atomic and molecular absorption, Transmittance.	12	2	a4, b1
13	**Instrumental analysis**	Absorbance and Beer's- Lambert's law Instrumentation of ultra violet and visible spectroscopy (ELISA)	13	2	a4, b1
14	**Separation and extraction methods**	Physical properties for Separation and extraction , (Filtration, distillation, Centrifugation, Evaporation, and membrane separation	14	2	a4
15	**Separation and extraction methods**	Fundamental of Chromatography	15	2	a4, b2
16	**Final Theoretical Exam**		16	2	All
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	Safety rules in laboratory, and using some of main equipment related to the course	1	2	
2	Using and standardization of volumetric glassware (pipits, burette, measuring flasks,)	2	2	
3	Preparation and standardization of different solutions from concentrated solution and from solid salt	3	2	
4	Determination of Ksp constant for some salts	4	2	
5	pH calculation for deferent solution and preparation of buffer solution.	5	2	
6	Determination of strong base by titration with standard solution of HCl	6	2	
7	Determination of weak base by titration with standard solution of HCl	7	2	
8	Mid exam	8	2	
9	Determination of ascorbic acid in vitamin C tablets by titration with Iodine solution	9	2	
10	Study of relationship between potential cell and solution concentration	10	2	
11	Determination the absorption spectrum λmax for some compound sample	11	2	
12	Determination the concentration of unknown sample using beer – Lambert's law	12	2	
13	Separation technics (Centrifuge of blood)	13	2	
14	Separation the pigments in ink by using Thin-Layer Chromatography(T.L.C)	14	2	
15	**Final Exam**	**15**	2	
16				
Number of Weeks /and Units Per Semester		**15**	**30**	

C. Tutorial Aspect: NONE				
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Number of Weeks /and Units Per Semester		**15**	**30**	

V. Teaching Strategies of the Course:

Interactive lectures

Group work

guided discussions

application-based discussions

Hands-on laboratory sessions

Practical show

Self-learning

Group activities

VI. Assessment Methods of the Course:

Quizzes

Home work

Midterm exam

Final exam

Observation checklist

Practical exam

Instructor observation

Group evaluation

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Attendance (Theoretical/Practical)**	All Weeks	**5/4**	
2	**Activities (Theoretical/Practical)**	All Weeks	**5/4**	a1,a2,a3,a4,b1,b2, b3,c1,c2,c3, d1,d2,d3,d4
3	**Med year exam (Theoretical/Practical)**	**8th**	**15/7**	a1,a2,a3,a4,b1,b2, b3,c1,c2,c3, d1,d2,d3,d4
4	**Final Practical exam**	**15th**	**15**	c1, c2, c3
5	**Final Theoretical exam**	**16th**	**45**	a1, a2, a3,a4,b1, b2, b3
Total			**100**	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Attendance (Theoretical/Practical)**	**All Weeks**	**5/4**	9%	
2	**Activities (Theoretical/Practical)**	**All Weeks**	**5/4**	9%	a1,a2,a3,a4,b1,b2,b3 c1,c2,c3,d1,d2,d3,d4
3	**Med year exam (Theoretical/Practical)**	**8th**	**15/7**	22%	a1,a2,a3,a4,b1,b2,b3 c1,c2,c3,d1,d2,d3,d4
4	**Final Practical exam**	**15th**	**15**	15%	c1, c2, c3
5	**Final Theoretical exam**	**16th**	**45**	45%	a1,a2,a3,a4,b1,b2,b3
Total			**100**	**100%**	

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

1- Douglas A. Skoog , et all, 2004, **Fundamentals of Analytical Chemistry**, 8th edition,

United States, Thomson Brooks/Cole.

2- Essential References:

2- G.H. Jeffry, et.al, 1989, **VOGEL's Text book of Quantitative Analytical Chemistry**, 5th edition, New York, Jone Willy &Sons.

3- Electronic Materials and Web Sites etc.:

Websites:

3- www.pubmed.com

4- www.chemweb.com

5- http:// www.britannica.com/EBchecked/topic/183000/electrochemical analys

Journals:

Other Web Sources:

6-

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي

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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Second Part of Course Specification

Faculty of Laboratory Medicine

Department of Chemistry

2025/2024م

Course Plan (Syllabus) of Analytical Chemistry

Course No. (…….)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	**Ahmed Ali Alhazmi**						
Location& Telephone No.:	**777181994**						
E-mail:		SAT	SUN	MON	TUE	WED	THU
Office Hours							

2025/2024م

I. Course Identification and General Information:

1	**Course Title:**	Analytical chemistry			
2	**Course Code & Number:**				
3	**Credit Hours/weak:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	1st Level / 2nd Semester			
5	**Pre –Requisite (if any):**	General Chemistry			
6	**Co –Requisite (if any):**	NONE			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Face to Face lecture and Lab. groups			
11	**Location of Teaching the Course:**	University Campus & Laboratories			
12	**Prepared by:**	Dr. Ahmed Ali Alhazmi			
13	**Date of Approval:**	2025			

II. Course Description:

This course aims to provide students with essential knowledge of analytical chemistry principles and their applications in laboratory medicine. It covers analytical errors, solution preparation, and concentration calculations, chemical equilibria, volumetric and electrochemical analysis, spectrophotometric, techniques, and basic chromatographic principles. The course emphasizes analytical reasoning, accurate data interpretation, and the application of analytical methods relevant to professional laboratory practice.

III. Course Intended Learning Outcomes (CILOs) :(مخرجات تعلم المقرر)

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:

a1	Explain the fundamental principles of analytical chemistry and the types of qualitative and quantitative analysis used in laboratory medicine. A1
a2	Describe sources of analytical errors, concepts of accuracy and precision, and methods of

	analytical data treatment. A1
a3	Explain chemical equilibrium concepts including solubility, pH, buffer solutions, and their relevance to analytical chemistry. A1
a4	Describe the basic principles of volumetric, electrochemical, and spectrophotometric analytical methods applied in medical laboratories. A1, A2
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Analyze analytical data and evaluate laboratory results in terms of accuracy and reliability. B1
b2	Compare different analytical methods and select the most appropriate method based on sample type and analytical purpose. B3
b3	Solve numerical problems related to solution concentrations, titrations, and spectrophotometric analysis accurately. B1
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Apply basic laboratory techniques for preparing standard solutions and performing volumetric titrations according to standard procedures. C2
c2	Use basic analytical instruments such as spectrophotometers in compliance with laboratory safety and quality requirements. C1, C2
c3	Adhere to biosafety, quality control, and laboratory safety guidelines during analytical experiments. C1
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Document and report analytical results in written form using appropriate scientific terminology. D3
d2	Work effectively as a member of a laboratory team and demonstrate professional responsibility. D2
d3	Use basic computer skills to process, analyze, and present analytical data. D5
d4	Demonstrate self-directed learning skills and continuous professional development in analytical chemistry.D6

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction**	– Definitions, importance, types of analytical chemistry. Qualitative and quantitative analysis, the mole calculations	1	2
2	**Analytical Errors**	– Units, errors and its reasons, types and handling analysis data (precision and accuracy). Solutions and their types	2	2

3	**Concentration of solutions**	– (Molarity, Normality, and Molality) and physical method (w/w% , w/v% and v/v%), ppm and ppt	3	2
4	**…**	– Solubility , solubility constant, and precipitate formation and factors affecting of precipitation and solubility	4	2
5	**Problems**	– Solving numerical problems about previous lessons	5	2
6	**Titrations**	Acid and base (strong and weak), pH calculations of theirs and buffer solutions .introduction to titration methods	6	2
7	**Titrations**	– Acid base titrations (types and plot titration curve according pH value	7	2
8	**Mid-Term Theoretical Exam**		8	2
9	**Titrations**	– Redox titration , balance redox equations in different media and Nernst's equations and plot titration curve according E value	9	2
10	**Instrumental analysis**	– Electrode potential ,types of half-cell, standard hydrogen electrode , galvanic cells , Faraday's law in electrical analysis	10	2
11	**Practice**	– Solving numerical problems about previous lessons	11	2
12	**Instrumental analysis**	Spectrophotometry:, absorption and emission, atomic and molecular absorption, Transmittance.	12	2
13	**Instrumental analysis**	Absorbance and Beer's- Lambert's law Instrumentation of ultra violet and visible spectroscopy (ELISA)	13	2
14	**Separation and extraction methods**	Physical properties for Separation and extraction , (Filtration, distillation, Centrifugation, Evaporation, and membrane separation	14	2
15	**Separation and extraction methods**	Fundamental of Chromatography	15	2
16	**Final Theoretical Exam**		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

B. Case Studies and Practical Aspect:			
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**
1	Safety rules in laboratory, and using some of main equipment	1	2

	related to the course		
2	Using and standardization of volumetric glassware (pipits, burette, measuring flasks,)	2	2
3	- Preparation and standardization of different solutions from concentrated solution and from solid salt	3	2
4	- Determination of Ksp constant for some salts	4	2
5	- pH calculation for deferent solution and preparation of buffer solution.	5	2
6	- Determination of strong base by titration with standard solution of HCl	6	2
7	- Determination of weak base by titration with standard solution of HCl	7	2
8	- Mid exam	8	2
9	Determination of ascorbic acid in vitamin C tablets by titration with Iodine solution	9	2
10	- Study of relationship between potential cell and solution concentration	10	2
11	- Determination the absorption spectrum λmax for some compound sample	11	2
12	- Determination the concentration of unknown sample using beer – Lambert's law	12	2
13	- Separation technics (Centrifuge of blood)	13	2
14	- Separation the pigments in ink by using Thin-Layer Chromatography(T.L.C)	14	2
15	- **Final Exam**	**15**	2
16			
Number of Weeks /and Units Per Semester		**15**	**30**

C. Tutorial Aspect: NONE			
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**
1			

2			
3			
4			
5			
6			
7			
8			
Number of Weeks /and Units Per Semester		**15**	**30**

V. Teaching Strategies of the Course:

Interactive lectures

Group work

guided discussions

application-based discussions

Hands-on laboratory sessions

Practical show

Self-learning

Group activities

VI. Assessment Methods of the Course:

Quizzes

Home work

Midterm exam

Final exam

Observation checklist

Practical exam

Instructor observation

Group evaluation

VII. Assignments:

No.	Assignments	Week Due	Mark
1	**Attendance (Theoretical/Practical)**	All Weeks	**5/4**
2	**Activities (Theoretical/Practical)**	All Weeks	**5/4**

3	**Med year exam (Theoretical/Practical)**	8th	**15/7**
4	**Final Practical exam**	15th	**15**
5	**Final Theoretical exam**	16th	**45**
Total			**100**

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	**Attendance (Theoretical/Practical)**	**All Weeks**	**5/4**	9%
2	**Activities (Theoretical/Practical)**	**All Weeks**	**5/4**	9%
3	**Med year exam (Theoretical/Practical)**	**8th**	**15/7**	22%
4	**Final Practical exam**	**15th**	**15**	15%
5	**Final Theoretical exam**	**16th**	**45**	45%
Total			**100**	**100%**

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

7- Douglas A. Skoog , et all, 2004, **Fundamentals of Analytical Chemistry**, 8th edition, United States, Thomson Brooks/Cole.

2- Essential References:

8- G.H. Jeffry, et.al, 1989, **VOGEL's Text book of Quantitative Analytical Chemistry**, 5th edition, New York, Jone Willy &Sons.

3- Electronic Materials and Web Sites etc.:

Websites:

9- www.pubmed.com

10- www.chemweb.com

11- http:// www.britannica.com/EBchecked/topic/183000/electrochemical analys

Journals:

Other Web Sources:

X. Course Policies: (Based on the Uniform Students' By law (2007) تترك كما هي	
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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Republic of Yemen
Jiblah University for Medical &Health sciences
Center Development & Quality Assurance

الجمهورية اليمنية
جامعة جبلة للعلوم الطبية والصحية
مركز التطوير و ضمان الجودة

Faculty of Laboratory medicine

Course Specification of First Aid

Course No. ( )

2024 /2025

I. Course Identification and General Information:

1	**Course Title:**	First Aid			
2	**Course Code & Number:**	----			
3	**Credit Hours/Week:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		1.5	1	--	1
4	**Study Level/ Semester at which this Course is offered:**	2nd Level / 1st Semester			
5	**Pre –Requisite (if any):**	Anatomy and Physiology			
6	**Co –Requisite (if any):**	non			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Face-to-face lectures, clinical rotations, simulated patient sessions			
11	**Location of Teaching the Course:**	Jiblah University Campus and Lab.			
12	**Prepared by:**	Dr. Baheeg Abdulwahed Almorisi			
13	**Date of Approval:**	2025			

II. Course Description:

A First Aid course specification outlines the knowledge, skills, required for providing immediate care to an injured or ill person before professional medical help arrives. The course typically covers topics such as recognizing and managing various medical emergencies, performing CPR, using a defibrillator, and understanding legal issues related to first aid. The specification also details the intended learning outcomes, assessment methods, and the required resources for delivering the training.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)	**Referenced PILOs (مخرجات تعلم البرنامج)**
II. Intended learning outcomes (ILOs) of the course:	

C. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
a1	Recognize the basic management, purpose, general rules, and limitations of first aid.	**A1**	Recognize the principles of social, behavioral health and first aid in, Laboratory medicine
a2	Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.		
a3	Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.		
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Discuss the relationship between human body systems, safe and effective use of medicine.	**B1**	Plan a modern system for administration of medical foundations and merge the ethics to business during the drug marketing .
b2	Identify the purpose, limitations, general rules and proper application of first-aid.		
b3	Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.		
b4	first aid to save life, prevent further injury, and limit infection.	**B2**	Interpret the prescriptions, patient and clinical data, Analysis all the encountered pharmaceutical problems and plan the strategies for their solution, to develop the health care
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature	**C1**	Provide patient-oriented pharmaceutical care by collaboration with other health care professionals to optimize therapeutic outcomes.
c2	Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.	**C2**	Conduct research studies and utilize the results in different pharmaceutical fields.
D. Transferable Skills: Upon successful completion of the course, students will be able to:			
d1	Provide emergency first aid.	**D1**	Develop financial, market management, writing, presentation and time management skills as well as creativity, critical thinking, problem solving and decision making abilities.
d2	Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.		

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a1	Recognize the basic management, purpose, general rules, and limitations of first aid.	Lectures, seminars and discussion	Quizzes, written exam (MCQ/Essay questions), assignments and participation
a2	Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.		
a3	Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.		
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1	Discuss the relationship between human body systems, safe and effective use of medicine.	Small group activities, brainstorming discussion	Oral exams, assignments, interpretative exercises
b2	Identify the purpose, Limitations, General Rules And proper application of first-aid.		
b3	Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.		
b4	first aid to save life, prevent further injury, and limit infection.		
(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
c1	Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature.	Lectures methods Practical session, brainstorming and group discussion	Practical works, homework, practical exam and practical reports.
c2	Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.		
(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
d1	Provide emergency first aid	discussion and practical classes	presentation and direct observations
d2	Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.		

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Introduction**	Identify the role and responsibilities of a first aider	1	2	a1-a3, b1-b3, d1-d2
2	**General rules of first aid**	• Conduct a scene survey • Conduct a primary survey of a casualty • Summon appropriate assistance when necessary	1	2	a1-a3, b1-b3, d1-d2
3	Cardiopulmonary resuscitation **(CPR)**	• Identify when to administer Cardio Pulmonary Resuscitation (CPR) Demonstrate CPR using a manikin • Justify when to place a casualty into the recovery position • Demonstrate how to place a casualty into the recovery position • Identify how to administer first aid to a casualty who is experiencing a seizure • heart attack, stroke	1	2	a1-a3, b1-b3, d1-d2
4	Airway obstruction	• Asthma, chest injury and allergy	1	2	a1-a3, b1-b3, d1-d2
5	**Fainting syncope**	•unconscious (including seizure	1	2	a1-a3, b1-b3, d1-d2
6	**Hemorrhage and shock**	• Identify when choking is mild or severe • Demonstrate how to administer first aid to a casualty who is choking • Identify the severity of external bleeding • Demonstrate how to control external bleeding	1	2	a1-a3, b1-b3, d1-d2
7	**Poisoning**	• Origins, sudden poisoning, anaphylactic shock and treatment	1	2	a1-a3, b1-b3, d1-d2
8	**Mid-Term Theoretical Exam**	Mid-Term	1	2	
9	**Home first aide**	• Essential medication in home, precaution, uses and side effects	1	2	a1-a3, b1-b3, d1-d2
10	**Burns**	• Identify how to administer first	1	2	a1-a3,

		aid to a casualty with minor burns and scalds.			b1-b3, d1-d2
11	**Food-Drug interaction**	• Types of food and drug that causing interaction, effects and treatment	1	2	a1-a3, b1-b3, d1-d2
12	**Convulsion**	• Epilepsy, thermal disturbance and convulsion in children	1	2	a1-a3, b1-b3, d1-d2
13	**Insect bites and stings**	• Types, origins, effects and Treatment	1	2	a1-a3, b1-b3, d1-d2
14	**Wounds**	• Identify how to administer first aid to a casualty with Small cuts, Grazes, Bruises and Small splinters. • Identify how to administer first aid to a casualty with minor burns and scalds. • Bone fracture, eye injury and ear bleeding.	1	2	a1-a3, b1-b3, d1-d2
15	**Drowning**	• Anatomy and physiology of respiratory system, how to rescue drowning victim.	1	2	a1-a3, b1-b3, d1-d2
16	**Final Theoretical Exam**	Final exam	1	2	All
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	Introduction	1	2	**c1-2, d1-2**
2	Vital Signs (Pulse, Bp, and Temperature.)	2	4	**c1, d1-2**
3	Cardiopulmonary Resuscitation (CPR).	2	4	**c2, d1-2**
4	Bleeding and Loss of Consciousness	1	2	**c2, d1-2**
5	Burns	1	2	**c2, d1-2**
6	Midterm Exam	1	2	
7	Shock	1	2	**c2, d1-2**
8	Poisoning	1	2	**c2, d1-2**
9	Insect bites and stings	1	2	**c2, d1-2**
10	Wounds	2	4	**c2, d1-2**

11	**Revision**	1	2	**c2, d1-2**
12	**Final Exam**	1	2	All
Number of Weeks /and Units Per Semester		**15**	**30**	

C. Tutorial Aspect:				
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	Introduction	1	2	**c1-2, d1-2**
2	**Vital Signs (Pulse, Bp, and Temperature.)**	2	4	**c1, d1-2**
3	**Cardiopulmonary Resuscitation (CPR).**	2	4	**c2, d1-2**
4	**Bleeding and Loss of Consciousness**	1	2	**c2, d1-2**
5	**Burns**	1	2	**c2, d1-2**
6	**Midterm Exam**	1	2	
7	**Shock**	1	2	**c2, d1-2**
8	**Poisoning**	1	2	**c2, d1-2**
9	**Insect bites and stings**	1	2	**c2, d1-2**
10	**Wounds**	2	4	**c2, d1-2**
11	Revision	1	2	**c2, d1-2**
12	Final Exam	1	2	
Number of Weeks /and Units Per Semester		**15**	**30**	

V. Teaching Strategies of the Course:

Lectures for knowledge and understanding including videos and simulators

VI. Assessment Methods of the Course:

Written examination by the end of the semester

VII. Assignments:

No.	**Assignments**	**Week Due**	**Mark**	**Aligned CILOs (symbols)**
1	**Attendance (Theoretical/practical)**	All Weeks	5/4	a1,a3, b1,b2, d1-2
2	**Activities (Theoretical/practical)**	All Weeks	5/4	a2, a4, b2-3, d1-2
3	**Med year exam (Theoretical/practical)**	8	15/7	c1-2

				a1-3, b1
4	**practical exam**	16	15	c1-2, d1-2
5	**Final exam**	16	45	a1-4, b1-b3
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance (Theoretical/practical)	All Weeks	5/4	9%	a1,a3, b1,b2, d1-2
2	**Activities (Theoretical/practical)**	All Weeks	5/4	9%	a2, a4, b2-3, d1-2
3	**Med year exam (Theoretical/practical)**	8	15/7	22%	c1-2 a1-3, b1
4	**practical exam**	16	15	15%	c1-2, d1-2
5	**Final exam**	16	45	45%	a1-4, b1-b3
Total			**100**	**100%**	

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

12- John Camm and Tim McCarthy, First Aid Step By Step

13- Seb Sevett 2009, 7th Edition …First Aid at work

2- Essential References:

14- David and carryl , first responder (you first response in emergency care)

3- Electronic Materials and Web Sites etc.:

Websites: https://www.besafetraining.co.nz/course-category/firstaid/?gclid=Cj0KCQjw6_vzBRCIARIsAOs54z5hXVslw7hYOvQ35HZlzjLDA981beaoxrEzYpXxr3tfDMcnX3vdyEaAkgWEALw_wcB

Journals:

Other Web Sources:

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي

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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Second Part of Course Specification

Faculty of Laboratory medicine

Department of All

2024/2025

Course Plan (Syllabus) of First Aid

Course No. (…….)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	**Baheeg Abdulwahed Almorisi**						
Location& Telephone No.:	**777774961**						
E-mail:		SAT	SUN	MON	TUE	WED	THU
Office Hours							

2024/2025

I. Course Identification and General Information:		
1	**Course Title:**	First Aid
2	**Course Code & Number:**	----

3	**Credit Hours/Week:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		1.5	1	--	1
4	**Study Level/ Semester at which this Course is offered:**	2^{nd} Level / 1^{st} Semester			
5	**Pre –Requisite (if any):**	Anatomy and Physiology			
6	**Co –Requisite (if any):**	non			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Face-to-face lectures, clinical rotations, simulated patient sessions			
11	**Location of Teaching the Course:**	Jiblah University Campus and Lab.			
12	**Prepared by:**	Dr. Baheeg Abdulwahed Almorisi			
13	**Date of Approval:**	2025			

II. Course Description:

A First Aid course specification outlines the knowledge, skills, and competencies required for providing immediate care to an injured or ill person before professional medical help arrives. The course typically covers topics such as recognizing and managing various medical emergencies, performing CPR, using a defibrillator, and understanding legal issues related to first aid. The specification also details the intended learning outcomes, assessment methods, and the required resources for delivering the training.

III. Course Intended Learning Outcomes (CILOs) :(مخرجات تعلم المقرر)

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:

a1	Recognize the basic management, purpose, general rules, and limitations of first aid.
a2	Describe the basic principles of normal and abnormal bodily functions in healthy and diseased states.

a3	Recognize the principles of body anatomy and function to perform first aid measures and initial therapy for injured and acutely ill patient.
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Discuss the relationship between human body systems, safe and effective use of medicine.
b2	Identify the purpose, Limitations, General Rules And proper application of first-aid.
b3	Select and assess appropriate methods of first aid to save life, prevent further injury, and limit infection.
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Implement different procedures for monitoring vital signs, including levels of responsiveness, pulse, Bp, breathing and temperature.
c2	Practice the first aid emergency for dealing with resuscitation, insect bites, shock, bleeding, burns, poisoning, convulsion and fractures.
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Provide emergency first aid
d2	Provide good advice about balanced diet to promote the efficiency of medication and give hand in poisoning cases.
d3	Manage time effectively

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction**	Identify the role and responsibilities of a first aider	1	2
2	**General rules of first aid**	• Conduct a scene survey • Conduct a primary survey of a casualty • Summon appropriate assistance when necessary	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
3	Cardiopulmonary resuscitation **(CPR)**	• Identify when to administer Cardio Pulmonary Resuscitation (CPR) Demonstrate CPR using a manikin • Justify when to place a casualty into the recovery position • Demonstrate how to place a casualty into the recovery position • Identify how to administer first aid to a casualty who is experiencing a seizure • heart attack, stroke	1	2
4	Airway obstruction	• Asthma, chest injury and allergy	1	2
5	**Fainting syncope**	•unconscious (including seizure	1	2
6	**Hemorrhage and shock**	• Identify when choking is mild or severe • Demonstrate how to administer first aid to a casualty who is choking • Identify the severity of external bleeding • Demonstrate how to control external bleeding	1	2
7	**Poisoning**	• Origins, sudden poisoning, anaphylactic shock and treatment	1	2
8	**Mid-Term Theoretical Exam**		1	2
9	**Home first aide**	• Essential medication in home, precaution, uses and side effects	1	2
10	**Burns**	• Identify how to administer first aid to a casualty with minor burns and scalds.	1	2
11	**Food-Drug interaction**	• Types of food and drug that causing interaction, effects and treatment	1	2
12	**Convulsion**	• Epilepsy, thermal disturbance and convulsion in children	1	2
13	**Insect bites and stings**	• Types, origins, effects and Treatment	1	2
14	**Wounds**	• Identify how to administer first aid to a casualty with Small cuts, Grazes, Bruises and Small splinters. • Identify how to administer first aid to a casualty with minor burns and scalds. • Bone fracture, eye injury and ear bleeding.	1	2
15	**Drowning**	• Anatomy and physiology of respiratory system, how to rescue drowning victim.	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
16	Final Theoretical Exam	Final exam	1	2
Number of Weeks /and Units Per Semester			16	32

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	Introduction	1	2
2	Vital Signs (Pulse, Bp, and Temperature.)	2	4
3	Cardiopulmonary Resuscitation (CPR).	2	4
4	Bleeding and Loss of Consciousness	1	2
5	Burns	1	2
6	Midterm Exam	1	2
7	Shock	1	2
8	Poisoning	1	2
9	Insect bites and stings	1	2
10	Wounds	2	4
11	**Revision**	1	2
12	**Final Exam**	1	2
Number of Weeks /and Units Per Semester		15	30

No.	Tutorial	Number of Weeks	Contact Hours
1	Introduction	1	2
2	**Vital Signs (Pulse, Bp, and Temperature.)**	2	4
3	**Cardiopulmonary Resuscitation (CPR).**	2	4
4	**Bleeding and Loss of Consciousness**	1	2
5	**Burns**	1	2
6	**Midterm Exam**	1	2
7	**Shock**	1	2
8	**Poisoning**	1	2
9	**Insect bites and stings**	1	2
10	**Wounds**	2	4
11	Revision	1	2
12	Final Exam	1	2
Number of Weeks /and Units Per Semester		15	30

V. Teaching Strategies of the Course:

Lectures for knowledge and understanding including videos and simulators

VI. Assessment Methods of the Course:

Written examination by the end of the semester

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Attendance (Theoretical/practical)**	All Weeks	5/4	a1,a3, b1,b2, d1-2
2	**Activities (Theoretical/practical)**	All Weeks	5/4	a2, a4, b2-3, d1-2
3	**Med year exam (Theoretical/practical)**	8	15/7	c1-2 a1-3, b1
4	**practical exam**	16	15	c1-2, d1-2
5	**Final exam**	16	45	a1-4, b1-b3
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance (Theoretical/practical)	All Weeks	5/4	9%	a1,a3, b1,b2, d1-2
2	**Activities (Theoretical/practical)**	All Weeks	5/4	9%	a2, a4, b2-3, d1-2
3	**Med year exam (Theoretical/practical)**	8	15/7	22%	c1-2 a1-3, b1
4	**practical exam**	16	15	15%	c1-2, d1-2
5	**Final exam**	16	45	45%	a1-4, b1-b3
Total			**100**	**100%**	

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

15- John Camm and Tim McCarthy, First Aid Step By Step
16- Seb Sevett 2009, 7th Edition …First Aid at work

2- Essential References:

17- David and carryl , first responder (you first response in emergency care)

3- Electronic Materials and Web Sites etc.:
Websites: https://www.besafetraining.co.nz/course-category/firstaid/?gclid=Cj0KCQjw6_vzBRCIARIsAOs54z5hXVslw7hYOvQ35HZlzjLDA981beaoxrEzYpXxr3tfDMcnX3vdyEaAkgWEALw_wcB **Journals:** **Other Web Sources:**

X. Course Policies: (Based on the Uniform Students' By law (2007) تترك كما هي	
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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Faculty of Laboratory Medicine

Department of Laboratory Medicine

Course Specification of

Diagnostic Parasitology

Course No. ( )

2025/2026

I. Course Identification and General Information:

	Course Title:	Diagnostic Parasitology			
2	**Course Code & Number:**	L.M.CAD2227			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	1	--	2
4	**Study Level/ Semester at which this Course is offered:**	4^{th} Level / 2^{nd} Semester			
5	**Pre –Requisite (if any):**	L.M.CAD2229 (Medical Protozoology) & L.M.CAD2228 (Medical Helminthology)			
6	**Co –Requisite (if any):**	None			
7	**Program (s) in which the Course is Offered:**	Faculty of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Full Time			
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. Sadiq Q.Al-Mohani			
13	**Date of Approval:**				

II. Course Description:

This course provides students with an integrative approach to the diagnosis of medically important parasites. It covers specimen collection, preservation, and laboratory diagnostic methods relevant to the most parasitic infections prevalent in the Yemeni community. Emphasis is placed on microscopy, staining, concentration techniques, and report writing.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)		Referenced PILOs (مخرجات تعلم البرنامج)	
D. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
a1	Describe the fundamental concepts and clinical importance of diagnostic parasitology.	**A1**	Demonstrate an understanding of the fundamental knowledge of biomedical and applied sciences related to the field of specialization.
a5	Identify the basic principles of sterilization, infection control, and contamination prevention applied in diagnostic parasitology laboratory according to WHO standards.	**A5**	Demonstrate knowledge of the principles and fundamentals of sterilization, infection control, and contamination prevention in accordance with internationally recognized standard
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Interpret parasitological laboratory results related to diagnostic procedures.	**B1**	Interpret medical laboratory results efficiently and professionally and identify technical errors.
b3	Evaluate the suitability of parasitological diagnostic methods for different clinical cases.	**B3**	Select appropriate diagnostic methods for each case, taking into account the cost and the significance of each method.
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Perform biosafety procedures during parasitology diagnostic practices.	**C1**	Implement quality management systems and biosafety procedures in laboratory practice.
c2	Operate laboratory equipment and instruments used in parasitological diagnostic procedures.	**C2**	Apply technical skills in using laboratory equipment, tools, and materials in laboratory practice.
c3	Follow standard operating procedures for the pre-analytical phase in parasitological testing.	**C3**	Collect, transport, preserve, and store specimens according to standard operating procedures (SOPs).
c4	Perform diagnostic techniques used to identify parasitic infections.	**C4**	Utilize various methods in diagnosing biochemical, hematological, immunological, microbiological, parasitological, and pathological diseases.
D. Transferable Skills: Upon successful completion of the course, students will be able to:			
d2	Collaborate effectively with peers and health professionals during laboratory work.	**D2**	Participate in teamwork harmoniously and exhibit collaboration with colleagues and other health care professional.
d3	Document laboratory findings related to parasitological diagnosis using appropriate scientific language.	**D3**	Document, communicate, and interact effectively using appropriate scientific language, both orally and in writing.

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
Course Intended Learning Outcomes		**Teaching Strategies**	**Assessment Strategies**
a1	Describe the fundamental concepts and clinical importance of diagnostic parasitology.	• Interactive Lectures	▪ Quizzes ▪ Midterm Exam

			▪ Final Written Exam
a5	Identify the basic principles of sterilization, infection control, and prevention applied in diagnostic parasitology laboratory according to WHO standards.	▪ Interactive Lectures ▪ Case studies	▪ Quizzes ▪ Oral exam. ▪ Midterm Exam ▪ Final Written Exam

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1	Interpret parasitological laboratory results related to diagnostic procedures.	▪ Interactive Lectures ▪ Case studies	▪ Quizzes ▪ Case-based questions
b3	Evaluate the suitability of parasitological diagnostic methods for different clinical cases.	▪ Interactive Lectures ▪ Microscopy training	▪ Practical exams ▪ Slide interpretation ▪ Case-based questions

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1	Implement biosafety procedures during parasitological diagnostic activities.	▪ Lab demonstrations ▪ Hands-on practice	▪ Direct observation ▪ Lab Reports
c2	Operate laboratory equipment and instruments used in parasitological diagnostic procedures.	▪ Supervised Lab Work ▪ Step-by-step demonstrations ▪ Hands-on Practice	▪ Practical Checklist ▪ Skills Logbook ▪ Spot Tests
c3	Follow standard operating procedures for the pre-analytical phase in parasitological testing.	▪ Lab Demonstrations ▪ Hands-on Practice ▪ Equipment Training ▪ Video Tutorials	▪ Maintenance Checklist ▪ Practical Exam
c4	Perform diagnostic techniques used to identify parasitic infections.	▪ Hands-on Practice ▪ Guided Reporting ▪ Feedback Sessions	▪ Written Quiz ▪ Oral Questions ▪ Report Assessment Rubric ▪ Peer Reviews

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d2	Collaborate effectively with peers and health professionals during laboratory work.	▪ Presentations ▪ Group Discussions ▪ Peer Collaboration ▪ Group Projects	▪ Skills assessment worksheets ▪ Team Presentations
d3	Document laboratory findings related to parasitological diagnosis using appropriate scientific	▪ Observation ▪ Case Studies	▪ Written group reports

	language.		

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Introduction to Diagnostic Parasitology**	– Overview of diagnostic parasitology. – Reagents, equipment, and safety in the parasitology lab. – Types of clinical specimens for parasitological diagnosis. – Principals of infection control prevention in laboratory practice.	1st	1	a1, a5, c1
2	**Clinical Features and Epidemiological Approach to Diagnostic Parasitology**	– Clinical symptoms, signs and complications of parasitic infections – Descriptive epidemiology as a guide for diagnostic Parasitology. – Endemic vs Non- Endemic areas – Epidemic and outbreaks of parasitic infections. – Evaluate risk factors and prevalence rate of parasitic infections. – Selection of appropriate parasitological diagnostic methods based on clinical presentation and epidemiological findings.	2nd	1	a1, b1, b3
3	**Hematological**	– Overview of the Blood and CBC	**3rd**	1	a1, b1, b3

	Alterations in Parasitic Infections	Parameters. – Importance of studying blood alterations in parasitic diseases. – General mechanisms of hematological alterations in Parasitic Infections focus on; malaria, leishmaniasis, schistosomiasis. – Selection of appropriate parasitological diagnostic methods based on clinical presentation and findings.			
4	**Pre Analytical Procedures in Diagnostic Parasitology Laboratory**	– Biosafety in diagnostic Parasitology. – Standard procedures for proper collection, labelling, and transport of clinical specimens to ensure diagnostic accuracy. – Preservation methods for various specimen types, including advantages and disadvantages of each method.	4th	1	a5, c3
5	**Microscopic Examination of Stool Specimens**	– Performance of direct wet mount preparations using normal saline and iodine to visualize and assess stool specimens. – Identification of intestinal parasites with emphasis on distinguishing true parasitic forms from non parametric artifacts.	5th	1	c2, c4
6	**Concentration Techniques for Stool Specimens**	– Utilization of concentration techniques involving sedimentation and flotation methods to increase the sensitivity of parasite detection in stool samples – Comparative assessment of commonly used concentration techniques, highlighting their respective advantages, limitations, and diagnostic applications	6th	1	b3, c2, c4
7	**Special Stool Techniques**	– Scotch tape and Anal swabs technique for pinworms eggs detection. – Hatching test for Schistosoma mansoni eggs. – Harada-Mori technique – Parasitic eggs counting estimating: advantages and disadvantages.	7th	1	c2, c4
8	**Mid-Term Theoretical Exam**	– Written Questions	8th	1	a1, a5, b1, b3, c1, c2,c3,c4
9	**Examination of Urogenital Specimens**	– Collection and preservation of urine specimens for detection of Schistosoma haematobium eggs. – Microscopic examination and identification of centrifuged sediment for Schistosoma haematobium eggs. – Collection and examination of genital	9th	1	b1, c3, c4

		specimens (vaginal swabs, urethral discharges) for Trichomonas vaginalis trophozoites using wet mount technique. – Differential diagnosis: distinguishing T. vaginalis from epithelial cells and other cellular elements. – Interpretation of findings in correlation with clinical symptoms and possible co-infections.			
10	**Examination of Blood Specimens for Malaria Parasites Diagnosis**	– Overview of thick and thin blood smear techniques used in malaria diagnosis, including their respective advantages and limitations. – Common staining methods used for the visualization of blood parasites. – Microscopic identification of Plasmodium species diagnostic stages. – Quantitative methods for parasite density estimation in malaria-infected blood samples.	10^{th}	1	b1, b3, c2, c3, c4
11	**Examination of Skin Specimens**	– Clinical presentation and differential diagnosis of cutaneous ulcers. – Collection techniques for skin scrapings and skin slit. – Preparation and staining of skin scraping smears. – Microscopic identification of Leishmania amastigotes in skin smears.	11^{th}	1	b1, b3, c2, c3, c4
12	**Examination of Buffy coat Specimens for blood and tissue parasites**	– Collection and preparation of buffy coat specimens from peripheral blood for detection Malaria and visceral Leishmania parasites. – Advantages and disadvantages of buffy coat specimens smears. – Limitations and diagnostic challenges of invasive sample collection in parasitic diseases.	12^{th}	1	b1, b3, c2, c3, c4
13	**Immuno-diagnosis of parasitic infections**	– Overview of Immuno-diagnostic Techniques: advantages and disadvantages. – Rapid Immunochromatographic Testing – Applications of Serology in Difficult-to-Detect Parasitic Infections – Evaluation of Serological Tests: Benefits and Limitations	13^{th}	1	a1, b1, b3
14	**Culture techniques in diagnostic Parasitology**	– Introduction to Culture Techniques – Culture of intestinal Protozoa – Culture of blood and tissue protozoa – Culture of Larval-stage Nematodes – Applications of Culture in diagnostic Parasitology. – Advantages and disadvantages	14^{th}	1	a1, b1, b3

15	**Post Analytical Procedures in Diagnostic Parasitology Laboratory**	– Post-analytical quality control procedures and documentation standards – Interpretation of laboratory findings in diagnostic parasitology – Effective reporting format and structured scientific writing – Providing specific and critical interpretative comments	15th	1	b1, d2, d3
16	**Final Term Theoretical Exam**	– Written Questions	16th	1	a1, a5, b1, b3, c1, c2, c3, c4, d3
Number of Weeks /and Units Per Semester			**16**	**16**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	**Introduction to Diagnostic Parasitology Practice** ▪ Overview of microscopy and micrometry. ▪ Equipment and reagents used in diagnostic parasitology. ▪ Safety precautions and quality assurance in the parasitology laboratory.	1st	2	**a1, a5, c1**
2	**Microscopic Examination of Stool Specimens** • Collection and Preservation of Stool Specimens • Methods for stool specimen collection. • Preservation techniques and types of preservatives. • Macroscopic examination of stool samples	2nd	2	**c2, c3**
3	**Concentration Techniques for Stool Specimens** • Sedimentation techniques (formalin-ether and formalin-ethyl acetate). • Flotation techniques (zinc sulfate flotation). • Comparison of methods	3rd	2	**b3, c2**
4	**Urogenital specimens for Detecting Parasitic Infections** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Urine specimens Collection, Transportation, Preservation and Storage. • Urine Examination for Schistosoma haematobium • Vaginal and Urethral Swab Collection • Identification of T. vaginalis diagnosis and differential diagnosis.	4th	2	**b1, c2, d2, d3**

	• Documenting and Reporting Lab Test Results.			
5	**Special Diagnostic Techniques for Stool Examination** • Occult blood testing. • Hatching tests for helminth eggs. • Scotch tape and NIH swab methods for Enterobius vermicularis.	5th	2	**a1, c2, c4**
6	**Permanent Stains for Stool Examination** • Iron hematoxylin stain. 9 • Modified Ziehl-Neelsen staining. • Trichrome and modified trichrome staining.	6th	2	**a1, c2, c4**
7	**Mid-Term Practical Exam** • Assessment of all skills and techniques covered in weeks 1–6.	7th	2	**b1, b3, c1, c2, c3, c4**
8	**Blood Specimens Examination for Malaria Parasites** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Preparation and staining of thick and thin blood films for malaria diagnosis. • Microscopic identification of Plasmodium species and estimation of parasite density (parasitemia level). • Documenting and Reporting Lab Test Results.	8th	2	**b1, c2, c4, d3**
9	**Buffy Coat Specimens for Blood and Tissue Protozoa** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Preparation and staining of buffy coat smears. • Microscopic examination of Leishmania donovani and Plasmodium falciparum. • Documenting and Reporting Lab Test Results.	9th	2	**c2, c4, d3**
10	**Skin Specimens Examination** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Collection and preparation and staining of skin scrapings and snips for detection of Leishmania amastigotes and Onchocerca volvulus microfilariae. • Microscopic identification. • Documenting and Reporting Lab Test Results.	10th	2	**c2, c4, d3**
11	**Examination of other Specimens** • Seminal fluid for suspected Trichomoniasis • Sputum for some Helminthes larvae. • Duodenal samples for Giardia lamblia.	11th	2	**c2, c3**
12	**Molecular Techniques for Parasitic Infections Diagnosis** • Principal of PCR (Polymerase Chain Reaction) for diagnosis of parasitic infections. • Importance of PCR for parasitic infections diagnosis and detection parasites species.	12th	2	**a1, b3, c2**

	• Advantages and Disadvantages of PCR			
13	**Immuno-diagnosis of Parasitic Infections** • Antigen Detection Techniques • Antibody Detection Techniques • ELISA (Enzyme-Linked Immunosorbent Assay) • Rapid Immunochromatographic Tests (ICTs) • Latex Agglutination Tests • Difference between IgM and IgG detection tests • Advantages and Disadvantages of each method	13th	2	**a1, c2**
14	**Review of Practical Techniques** • Comprehensive review of all techniques and methodologies practiced during the course.	14th	2	**a1, b3**
15	**Final Term Practical Exam** • Assessment of practical skills, including specimen handling, staining, and diagnostic proficiency.	**15th**	2	**a1, b1, b3, c1, c2, c3, c4, d3**
Number of Weeks /and Units Per Semester		**15**	**30**	

C. Tutorial Aspect:				
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	None			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Number of Weeks /and Units Per Semester		**15**	**30**	

V. Teaching Teaching Strategies of the Course:

Theoretical Teaching Strategies

- Interactive Lectures
- Presentations
- Videos
- Brain Storming
- Case Studies
- Group Discussions
- Peer Collaboration Learning
- Feedback Sessions

Practical Teaching Strategies

- Practical Sessions
- Demonstrations
- Hands-on Practice
- Safety Briefings
- Supervised Lab Work
- Step-by-step Demonstrations
- Equipment Training
- Video Tutorials
- Report Writing Training
- Guided Reporting
- Group Projects
- Observation

VI. Assessment Methods of the Course:

Theoretical Assessment Methods

- Quizzes
- Assignments
- Midterm Written Exam
- Final Term Written Exam
- In- class Oral Exam
- Case-Based Questions

Practical and Laboratory Assessment Methods

- Midterm Exam
- Final Term Exam
- Assignments
- Slide Interpretation Tasks
- Direct Observation of Practical Skills
- Lab Reports
- Practical Skills Checklist

Written and Group-Based Evaluation

- Written Reports
- Report Assessment Rubric
- Peer Reviews
- Team Presentations
- Written Group Reports

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Recent clinical parasitic diagnosis methods**	10th	5	d1, d3
2				
3				
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Assignments**	10th	8	8%	d2
2	**Midterm Practical Exam**	7th	7	7%	**b1, b3, c1, c2, c3, c4**
3	**Midterm Theoretical Exam**	8th	15	15%	a1, a5, b1, b3, c1, c2,c3,c4
4	**Final term Practical Exam**	15th	15	15%	**a1, b1, b3, c1, c2, c3, c4, d3**
5	**Final term Theoretical Exam**	16th	45	45%	a1, a5, b1, b3, c1, c2,c3,c4, d3
6	**Final Accumulated Exam**	16th	10	10%	a1
Total			**100**	**100%**	

IX. Learning Resources:

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

18- Garcia, L. S. (2016). Diagnostic medical parasitology (6th ed.). Washington, DC: ASM Press.

19- Gillespie, S., & Pearson, R. D. (Eds.). (2001). Principles and practice of clinical parasitology. John Wiley & Sons.

2- Essential References:

20- Garcia, L. S. (2016). Diagnostic medical parasitology (6th ed.). Washington, DC: ASM Press.

21- Cheesbrough, M. (2005). District laboratory practice in tropical countries: Part 1 (2nd ed.).

Cambridge University Press.
3- Electronic Materials and Web Sites etc.:
Websites: Center for Diseases Control (CDC) 22- https://www.cdc.gov/dpdx/diagnosticprocedures/index.html **Journals: Springer Journal** 23- https://link.springer.com/journal/436 **Other Web Sources: Parasites & Vectors** 24- https://www.ajtmh.org/configurable/home 25- https://parasitesandvectors.biomedcentral.com/

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي	
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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Second Part of Course Specification

Faculty of Laboratory Medicine

Department of Laboratory Medicine

2025/2026م

Course Plan (Syllabus) of Diagnostic Parasitology

Course No. (…….)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	**Dr/Sadiq Q.Al-Mohani**						
Location& Telephone No.:	**Ibb City - 777410819**						
E-mail:		SAT	SUN	MON	TUE	WED	THU
Office Hours							

2025/2026م

I. Course Identification and General Information:

	Course Title:	**Diagnostic Parasitology**			
2	**Course Code & Number:**	**L M. CAD 4227**			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	1	--	2
4	**Study Level/ Semester at which this Course is offered:**	4^{th} Level / 2^{nd} Semester			
5	**Pre –Requisite (if any):**	L.M.CAD2229 (Medical Protozoology) & L.M.CAD2228 (Medical Helminthology)			
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:**	Regular (semester)			
10	**Mode of Delivery:**	Full Time			
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr Sadiq Q.Al-Mohani			
13	**Date of Approval:**				

II. Course Description:

This course provides students with an integrative approach to the diagnosis of medically important parasites. It covers specimen collection, preservation, and laboratory diagnostic methods relevant to the most parasitic infections prevalent in the Yemeni community. Emphasis is placed on microscopy, staining, concentration techniques, and report writing.

III. Course Intended Learning Outcomes (CILOs) :(مخرجات تعلم المقرر)

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:

a1	Describe the fundamental concepts and clinical importance of diagnostic parasitology.
a5	Identify the basic principles of sterilization, infection control, and contamination prevention applied in

	diagnostic parasitology laboratory according to WHO standards.
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Interpret parasitological laboratory results related to diagnostic procedures.
b3	Evaluate the suitability of parasitological diagnostic methods for different clinical cases.
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Perform biosafety procedures during parasitology diagnostic practices.
c2	Operate laboratory equipment and instruments used in parasitological diagnostic procedures.
c3	Follow standard operating procedures for the pre-analytical phase in parasitological testing.
c4	Perform diagnostic techniques used to identify parasitic infections.
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Participate effectively in team-based laboratory activities related to parasitological diagnosis.
d3	Document laboratory findings related to parasitological diagnosis using appropriate scientific language.

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction to Diagnostic Parasitology**	– Overview of diagnostic parasitology. – Reagents, equipment, and safety in the parasitology lab. – Types of clinical specimens for	1st	1

		parasitological diagnosis. – Principals of infection control prevention in laboratory practice.		
2	**Clinical Features and Epidemiological Approach to Diagnostic Parasitology**	– Clinical symptoms, signs and complications of Parasitic infections. – Descriptive epidemiology as a guide for diagnostic Parasitology. – Endemic vs Non- Endemic areas – Epidemic and outbreaks of parasitic infections. – Evaluate risk factors and prevalence rate of parasitic infections. – Selection of appropriate parasitological diagnostic methods based on clinical presentation and epidemiological findings.	2nd	1
3	**Hematological Alterations in Parasitic Infections**	– Overview of the Blood and CBC Parameters. – Importance of studying blood alterations in parasitic diseases. – General mechanisms of hematological alterations in Parasitic Infections focus on; malaria, leishmaniasis, schistosomiasis. – Selection of appropriate parasitological diagnostic methods based on clinical presentation and findings.	**3rd**	1
4	**Pre Analytical Procedures in Diagnostic Parasitology Laboratory**	– Biosafety in diagnostic Parasitology. – Standard procedures for proper collection, labelling, and transport of clinical specimens to ensure diagnostic accuracy. – Preservation methods for various specimen types, including advantages and disadvantages of each method.	4th	1
5	**Microscopic Examination of Stool Specimens**	– Performance of direct wet mount preparations using normal saline and iodine to visualize and assess stool specimens. – Identification of intestinal parasites with emphasis on distinguishing true parasitic forms from non-parasitic artefacts.	5th	1
6	**Concentration Techniques for Stool Specimens**	– Utilization of concentration techniques involving sedimentation and flotation methods to increase the sensitivity of parasite detection in stool samples – Comparative assessment of commonly used concentration techniques, highlighting their respective advantages, limitations, and diagnostic applications	6th	1
7	**Special Stool**	– Scotch tape and Anal swabs technique	7th	1

	Techniques	for pinworms eggs detection. – Hatching test for Schistosoma mansoni eggs. – Parasitic eggs counting estimating: advantages and disadvantages. – Harada-Mori technique		
8	**Mid-Term Theoretical Exam**	– Written Questions	8th	1
9	**Examination of Urogenital Specimens**	– Collection and preservation of urine specimens for detection of Schistosoma haematobium eggs. – Microscopic examination and identification of centrifuged sediment for Schistosoma haematobium eggs. – Collection and examination of genital specimens (vaginal swabs, urethral discharges) for Trichomonas vaginalis trophozoites using wet mount technique. – Differential diagnosis: distinguishing T. vaginalis from epithelial cells and other cellular elements. – Interpretation of findings in correlation with clinical symptoms and possible co-infections.	9th	1
10	**Examination of Blood Specimens for Malaria Parasites Diagnosis**	– Overview of thick and thin blood smear techniques used in malaria diagnosis, including their respective advantages and limitations. – Common staining methods used for the visualization of blood parasites. – Microscopic identification of Plasmodium species diagnostic stages. – Quantitative methods for parasite density estimation in malaria-infected blood samples.	10th	1
11	**Examination of Skin Specimens**	– Clinical presentation and differential diagnosis of cutaneous ulcers. – Collection techniques for skin scrapings and skin slit. – Preparation and staining of skin scraping smears. – Microscopic identification of Leishmania amastigotes in skin smears.	11th	1
12	**Examination of Buffy coat Specimens for blood and tissue parasites**	– Collection and preparation of buffy coat specimens from peripheral blood for detection Malaria and visceral Leishmania parasites. – Advantages and disadvantages of buffy coat specimens smears. – Limitations and diagnostic challenges of invasive sample collection in parasitic diseases.	12th	1

13	**Immuno-diagnosis of parasitic infections**	– Overview of Immuno-diagnostic Techniques: advantages and disadvantages. – Rapid Immunochromatographic Testing – Applications of Serology in Difficult-to-Detect Parasitic Infections – Evaluation of Serological Tests: Benefits and Limitations	13th	1
14	**Culture techniques in diagnostic Parasitology**	– Introduction to Culture Techniques – Culture of intestinal Protozoa – Culture of blood and tissue protozoa – Culture of Larval-stage Nematodes – Applications of Culture in diagnostic Parasitology. – Advantages and disadvantages	14th	1
15	**Post Analytical Procedures in Diagnostic Parasitology Laboratory**	– Post-analytical quality control procedures and documentation standards – Interpretation of laboratory findings in diagnostic parasitology – Effective reporting format and structured scientific writing – Providing specific and critical interpretative comments	15th	1
16	**Final Term Theoretical Exam**	– Written Questions	16th	1
Number of Weeks /and Units Per Semester			**16**	**32**

B. Case Studies and Practical Aspect:			
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**
1	**Introduction to Diagnostic Parasitology Practice** ▪ Overview of microscopy and micrometry. ▪ Equipment and reagents used in diagnostic parasitology. ▪ Safety precautions and quality assurance in the parasitology laboratory.	1st	2
2	**Microscopic Examination of Stool Specimens** • Collection and Preservation of Stool Specimens • Methods for stool specimen collection. • Preservation techniques and types of preservatives. • Macroscopic examination of stool samples	2nd	2
3	**Concentration Techniques for Stool Specimens** • Sedimentation techniques (formalin-ether and formalin-ethyl acetate). • Flotation techniques (zinc sulfate flotation).	3rd	2

	• Comparison of methods		
4	**Urogenital specimens for Detecting Parasitic Infections** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Urine specimens Collection, Transportation, Preservation and Storage. • Urine Examination for Schistosoma haematobium • Vaginal and Urethral Swab Collection • Identification of T. vaginalis diagnosis and differential diagnosis. • Documenting and Reporting Lab Test Results.	4th	2
5	**Special Diagnostic Techniques for Stool Examination** • Occult blood testing. • Hatching tests for helminth eggs. • Scotch tape and NIH swab methods for Enterobius vermicularis.	5th	2
6	**Permanent Stains for Stool Examination** • Iron hematoxylin stain. • Modified Ziehl-Neelsen staining. • Trichrome and modified trichrome staining.	6th	2
7	**Mid-Term Practical Exam** • Assessment of all skills and techniques covered in weeks 1–6.	7th	2
8	**Blood Specimens Examination for Malaria Parasites** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Preparation and staining of thick and thin blood films for malaria diagnosis. • Microscopic identification of Plasmodium species and estimation of parasite density (parasitemia level). • Documenting and Reporting Lab Test Results.	8th	2
9	**Buffy Coat Specimens for Blood and Tissue Protozoa** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Preparation and staining of buffy coat smears. • Microscopic examination of Leishmania donovani and Plasmodium falciparum. • Documenting and Reporting Lab Test Results.	9th	2
10	**Skin Specimens Examination** • Quality Control Procedures (Pre analytical, Analytical, Post analytical). • Collection and preparation and staining of skin scrapings and snips for detection of Leishmania amastigotes and Onchocerca volvulus microfilariae. • Microscopic Identification • Documenting and Reporting Lab Test Results.	10th	2
11	**Examination of other Specimens** • Seminal fluid for suspected Trichomoniasis • Sputum for some Helminthes larvae. • Duodenal samples for Giardia lamblia.	11th	2
12	**Molecular Techniques for Parasitic Infections Diagnosis**	12th	2

	• Principal of PCR (Polymerase Chain Reaction) for diagnosis of parasitic infections. • Importance of PCR for parasitic infections diagnosis and detection parasites species. • Advantages and Disadvantages of PCR		
13	**Immuno-diagnosis of Parasitic Infections** • Antigen Detection Techniques • Antibody Detection Techniques • ELISA (Enzyme-Linked Immunosorbent Assay) • Rapid Immunochromatographic Tests (ICTs) • Latex Agglutination Tests • Difference between IgM and IgG detection tests • Advantages and Disadvantages of each method	13th	2
14	**Review of Practical Techniques** • Comprehensive review of all techniques and methodologies practiced during the course.	14th	2
15	**Final Term Practical Exam** • Assessment of practical skills, including specimen handling, staining, and diagnostic proficiency.	15th	2
Number of Weeks /and Units Per Semester		**15**	**30**

C. Tutorial Aspect:			
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**
1	None		
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
Number of Weeks /and Units Per Semester		**15**	**30**

V. Teaching Strategies of the Course:

Theoretical Teaching Strategies

- Interactive Lectures
- Presentations
- Videos
- Brain Storming
- Case Studies
- Group Discussions
- Peer Collaboration Learning
- Feedback Sessions

Practical Teaching Strategies

- Practical Sessions
- Demonstrations
- Hands-on Practice
- Safety Briefings
- Supervised Lab Work
- Step-by-step Demonstrations
- Equipment Training
- Video Tutorials
- Report Writing Training
- Guided Reporting
- Group Projects
- Observation

VI. Assessment Methods of the Course:

Theoretical Assessment Methods

- Quizzes
- Assignments
- Midterm Written Exam
- Final Term Written Exam
- In- class Oral Exam
- Case-Based Questions

Practical and Laboratory Assessment Methods

- Midterm Exam
- Final Term Exam
- Assignments
- Slide Interpretation Tasks
- Direct Observation of Practical Skills
- Lab Reports
- Practical Skills Checklist

Written and Group-Based Evaluation

- Written Reports
- Report Assessment Rubric
- Peer Reviews
- Team Presentations
- Written Group Reports

VII. Assignments:

No.	Assignments	Week Due	Mark
1	**Recent clinical parasitic diagnosis methods**	5^{th} -12^{th}	
2			
3			
Total			

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment

1	**Assignments**	10th	8	8%
2	**Midterm Practical Exam**	7th	7	7%
3	**Midterm Theoretical Exam**	8th	15	15%
4	**Final term Practical Exam**	15th	15	15%
5	**Final term Theoretical Exam**	16th	45	45%
6	**Final Accumulated Exam**	16th	10	10%
Total			**100**	**100%**

IX. Learning Resources:

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

1. Garcia, L. S. (2016). Diagnostic medical parasitology (6th ed.). Washington, DC: ASM Press.
2. Gillespie, S., & Pearson, R. D. (Eds.). (2001). Principles and practice of clinical parasitology. John Wiley & Sons.

2- Essential References:

1. Garcia, L. S. (2016). Diagnostic medical parasitology (6th ed.). Washington, DC: ASM Press.
2. Cheesbrough, M. (2005). District laboratory practice in tropical countries: Part 1 (2nd ed.). Cambridge University Press.

3- Electronic Materials and Web Sites etc.:

Websites: Center for Diseases Control (CDC)

1. https://www.cdc.gov/dpdx/diagnosticprocedures/index.html

Journals: Springer Journal

2. https://link.springer.com/journal/436

Other Web Sources: Parasites & Vectors

3. https://www.ajtmh.org/configurable/home
4. https://parasitesandvectors.biomedcentral.com/

X. Course Policies: (Based on the Uniform Students' By law (2007)

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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

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.

Faculty of Laboratory Medicine

Department of Hematology

Course Specification of

Principles of Hematology

Course No. ( )

2025م

I. Course Identification and General Information:

1	**Course Title:**	Principles of hematology			
2	**Course Code & Number:**	----			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	2^{nd} Level / 1^{st} Semester			
5	**Pre –Requisite (if any):**	Physiology, Histology			
6	**Co –Requisite (if any):**	None			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Direct face to face			
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. Jamil M.A.S. Obaid			
13	**Date of Approval:**				

II. Course Description:

This is an introductory course in the hematology discipline that provides laboratory medicine students with the principles and foundations of hematology. It covers the detailed description of blood cellular constituents and their ontogeny (step-by-step hemopoiesis processes), structure, physiology, functions and fate, in addition to the bone marrow structure and study methods. This course focuses on equipping the students with the basics and the laboratory analysis of blood and bone marrow, their state in normal conditions, and their possible deviations in the disease state.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)

E. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
a1	Demonstrate knowledge on the principles of hematology and normal development and functions of blood cells	**A1**	
a2	Recognize the standard hematology parameters, their clinical indications and the variations that deviate from the normal.	**A3**	
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Integrate the principles of hematology in clinical practice to detect alterations in disease states	**B4**	
b2	Evaluate and interpret relevant hematological laboratory tests for various health conditions	**B3**	
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Collect, prepare and preserve correctly blood samples safely and efficiently.	**C3**	
c2	Perform efficiently the basic hematological investigations using different techniques.	**C4**	
D. Transferable Skills: Upon successful completion of the course, students will be able to:			
d1	Communicate effectively with colleagues and other health care professionals	**D3**	

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a1	Demonstrate knowledge on the principles of hematology and normal development and	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works	▪ Written tests (Mid and Final exams and Quizzes)

	functions of blood cells		▪ Assignment ▪ Short essays
a2	Recognize the standard hematology parameters, their clinical indications and the variations that deviate from the normal.	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Case studies	▪ Written tests (Mid and Final exams and Quizzes) ▪ Assignment ▪ Short essays ▪ Reports

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Integrate the principles of hematology in clinical practice to detect alterations in disease states	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Case studies ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Assignment ▪ Short essays ▪ Reports
b2	Evaluate and interpret relevant hematological laboratory tests for various health conditions	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Case studies	▪ Written tests (Mid and Final exams and Quizzes) ▪ Short essays ▪ Reports

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Collect, prepare and preserve correctly blood samples safely and efficiently.	▪ Interactive lectures ▪ Laboratory based session ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Reports
c2	Perform efficiently the basic hematological investigations using different techniques.	▪ Interactive lectures ▪ Laboratory based session ▪ Case studies ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Short essays ▪ Reports

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Communicate effectively with colleagues and other health care professionals	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Team work	▪ Assignment ▪ Short essays ▪ Reports

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Introduction to hematology**	▪ Basic concepts, blood components; **RBCs, WBCs, and PLTs, and their normal range**	1	2	a1, a2, b1, b2, d1
2	**Hemoglobin**	▪ **Biosynthesis, structure, types, function; Hb-O2 dissociation curve, genes of Hb chains, variant hemoglobin, Hb variant assays**	2	4	a1, a2, b1, b2, d1
3	**Red blood cells**	▪ **RBCs structure, description membrane composition, metabolic Processes in RBCs, RBCs senescence, destruction and red cell indices**	2	4	a1, a2, b1, b2, d1
4	**Hemopoiesis**	▪ **Description, origins, stem cells, cell cycle and apoptosis, microenvironments and regulation of hemopoiesis; growth factors, transcription factors** ▪ **Bone marrow structure, studies and indications**	2	4	a1, a2, b1, d1
5	**Mid-Term Theoretical Exam**		1	2	a1, a2, b1, b2, d1
6	**Erythropoiesis and thrombopoiesis**	▪ **Detailed processes description, requirements and cells description**	1	2	a1, a2, b1, b2, d1
7	**Granulopoiesis, monopoiesis and lymphopoiesis**	▪ **Detailed process and cells description, development of macrophages and plasma cells**	1	2	a1, a2, b1, b2, d1
8	**Leucocytes**	▪ **Types and functions and of leucocytes, total and differential WBC count.** ▪ **Morphology of mature leucocytes in blood and their functions** ▪ **Monocyte macrophage system (RES)**	2	4	a1, a2, b1, b2, d1
9	**Lymphocytes**	▪ **Anatomical origin and development of lymphocytes and types** ▪ **Morphological characteristics of normal lymphocytes** ▪ **Variants of lymphocyte** ▪ **Plasma Cell Development and Maturation**	1	2	a1, a2, b1, b2, d1
10	**Cell markers and immunophenotyping**	▪ **Cell markers definitions, types and characteristics of major normal cell clones** ▪ **Principles of immunophenotyping**	1	2	a1, a2, b1, b2, d1
11	**Spleen**	▪ **The anatomy and circulation of the spleen, functions of the**	1	2	a1, a2,

		spleen, extramedullary hemopoiesis, splenomegaly, hypersplenism, hypersplenism, splenectomy			b1, b2, d1
12	**Final theoretical exam**		1	2	a1, a2, b1, b2, d1
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	**Safety requirements in hematology lab**	1	2	c1, c2, d1
2	**Anticoagulants preparation, use, mode of action**	1	2	a2, b2, c1, c2, d1
3	**Blood samples collection, training**	1	2	a2, b2, c1, c2, d1
4	**Blood separation, plasma and serum preparation**	1	2	a2, b2, c1, c2, d1
5	**Hb determination (all methods)**	1	2	a2, b2, c1, c2, d1
6	**PCV and ESR**	1	2	a2, b2, c1, c2, d1
7	**RBCs count**	1	2	a2, b2, c1, c2, d1
8	**Midterm practical exam**	1	2	a2, b2, c1, c2, d1

9	**WBCs count**	1	2	a2, b2, c1, c2, d1
10	**Platelets count**	1	2	a2, b2, c1, c2, d1
11	**Blood film preparation and staining**	1	2	a2, b2, c1, c2, d1
12	**Blood film examination and report**	2	4	a2, b2, c1, c2, d1
13	Final Practical exam	1	2	a2, b2, c1, c2, d1
Number of Weeks /and Units Per Semester		14	28	

C. Tutorial Aspect:				
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	NA			

V. Teaching Strategies of the Course:

1. Interactive lectures
2. Seminars
3. Exercises and home works
4. Laboratory based session
5. Case studies
6. Team work

VI. Assessment Methods of the Course:

1. Written tests (Mid and Final exams and Quizzes)
2. Assignment
3. Short essays
4. Reports

VII. Assignments:

No.	**Assignments**	**Week Due**	**Mark**	**Aligned CILOs (symbols)**
1	**Calculation and interpretation of different red cell indices**		2.5	a2, b1, b2, d1

2	**Immunophenotype of developed cell (one lineage)**		2.5	a2, b1, b2, d1
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Assignment**	4, 10	10	10	a2, b1, b2, d1
2	**Quizz**	6, 12	10	10	a1, a2, b1, b2, d1
3	**Midterm theory exam**	8	10	10	a1, a2, b1, b2, d1
4	**Midterm practical exam**	9	5	5	a2, b2, c1, c2, d1
5	**Reports and activity in lab**	All lab lessons	5	5	b2, c1,c2, d1
6	**Final practical exam**	14	20	20	a2, b2, c1, c2, d1
7	**Final theory exam**	16	40	40	a1, a2, b1, b2, d1
Total			**100**	**100**	

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

26- Hoffbrand A.V. and Moss P.A.H. essential hematology. 6th edition.2011. John Wiley and Sons Ltd. USA.

27- Turgeon M.L. Clinical hematology : theory and procedures. 5th ed. 2012. Lippincott Williams & Wilkins, USA.

2- Essential References:

28- Harmening, Denise M. Clinical Hematology and Fundamentals of Hemostasis. 5th edition 2008. F.A. Davis. Philadelphia.USA

29- Bain B. Blood cells: A practical guid. 4th edition. 2006. Wiley-Blackwell.

30- Greer J.P. Arber D.A. Glader B. Wintrob,s Clinical Hematology. 2013. LWW. USA

31- Harmening D. and Finnegan K. Heme Notes: A Pocket Atlas of Cell Morphology. 2014. F.A. Davis. Philadelphia. USA.

32- Lewis S.M. Bain B.J. Bates I. Dacie and Lewis Practical Haematology' 10th Edition, 2012, Churchill Livingstone Elsevier.

3- Electronic Materials and Web Sites etc.:

Websites:

1. American Society of Hematology (ASH)
https://www.hematology.org/
2. European Hematology Association (EHA)
https://ehaweb.org/
3. International Society on Thrombosis and Haemostasis (ISTH)
https://www.isth.org/
4. British Society for Haematology (BSH)
https://b-s-h.org.uk/

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي	
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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Second Part of Course Specification

Faculty of Laboratory Medicine

Department of Hematology

Course Specification of

Principles of Hematology

2025م

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:							
Location& Telephone No.:							
E-mail:		SAT	SUN	MON	TUE	WED	THU

Office Hours						

I. Course Identification and General Information:

	Course Title:	Principles of hematology			
2	**Course Code & Number:**	----			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	2^{nd} Level / 1^{st} Semester			
5	**Pre –Requisite (if any):**	Physiology, Histology			
6	**Co –Requisite (if any):**	None			
7	**Program (s) in which the Course is Offered:**	Bachelor of Laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Direct face to face			
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. Jamil M.A.S. Obaid			
13	**Date of Approval:**				

II. Course Description:

This is an introductory course in the hematology discipline that provides laboratory medicine students with the principles and foundations of hematology. It covers the detailed description of blood cellular constituents and their ontogeny (step-by-step hemopoiesis processes), structure, physiology, functions and fate, in addition to the bone marrow structure and study methods. This course focuses on equipping the students with the basics and the laboratory analysis of blood and bone marrow, their state in normal conditions, and their possible deviations in the disease state.

III. Course Intended Learning Outcomes (CILOs): (مخرجات تعلم المقرر)

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:	
a1	Demonstrate knowledge on the principles of hematology and normal development and functions of blood cells
a2	Recognize the standard hematology parameters, their clinical indications and the variations that deviate from the normal.
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Integrate the principles of hematology in clinical practice to detect alterations in disease states
b2	Evaluate and interpret relevant hematological laboratory tests for various health conditions
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Collect, prepare and preserve correctly blood samples safely and efficiently.
c2	Perform efficiently the basic hematological investigations using different techniques.
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Communicate effectively with colleagues and other health care professionals

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Introduction to hematology**	– Basic concepts, blood components; **RBCs, WBCs, and PLTs, and their normal range**	1	2
2	**Hemoglobin**	– **Biosynthesis, structure, types, function; Hb-O2 dissociation curve, genes of Hb chains, variant hemoglobin, Hb variant assays**	2	4
3	**Red blood cells**	– **RBCs structure, description membrane composition, metabolic Processes in RBCs, RBCs senescence, destruction and red cell indices**	2	4
4	**Hemopoiesis**	▪ **Description, origins, stem cells, cell cycle and apoptosis, microenvironments and regulation of hemopoiesis; growth factors, transcription factors** ▪ **Bone marrow structure, studies and indications**	2	4
5	**Mid-Term Theoretical Exam**	–	1	2
6	**Erythropoiesis and thrombopoiesis**	**Detailed processes description, requirements and cells description**	1	2
7	**Granulopoiesis, monopoiesis and lymphopoiesis**	– **Detailed process and cells description, development of macrophages and plasma cells**	1	2

8	**Leucocytes**	▪ **Types and functions and of leucocytes, total and differential WBC count.** ▪ **Morphology of mature leucocytes in blood and their functions** – **Monocyte macrophage system (RES)**	2	4
9	**Lymphocytes**	▪ **Anatomical origin and development of lymphocytes and types** ▪ **Morphological characteristics of normal lymphocytes** ▪ **Variants of lymphocyte** – **Plasma Cell Development and Maturation**	1	2
10	**Cell markers and immunophenotyping**	▪ **Cell markers definitions, types and characteristics of major normal cell clones** – **Principles of immunophenotyping**	1	2
11	**Spleen**	– **The anatomy and circulation of the spleen, functions of the spleen, extramedullary hemopoiesis, splenomegaly, hypersplenism, hypersplenism, splenectomy**	1	2
12	**Final theoretical exam**		1	2
Number of Weeks /and Units Per Semester			**16**	**32**

B. Case Studies and Practical Aspect:			
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**
1	**Safety requirements in hematology lab**	1	2
2	**Anticoagulants preparation, use, mode of action**	1	2
3	- **Blood samples collection, training**	1	2
4	- **Blood separation, plasma and serum preparation**	1	2
5	- **Hb determination (all methods)**	1	2
6	- **PCV and ESR**	1	2
7	- **RBCs count**	1	2
8	- **Midterm practical exam**	1	2
9	**WBCs count**	1	2
10	- **Platelets count**	1	2
11	- **Blood film preparation and staining**	1	2
12	- **Blood film examination and report**	2	4
13	- Final Practical exam	1	2

Number of Weeks /and Units Per Semester	15	30

C. Tutorial Aspect:			
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**
1	NA		

V. Teaching Strategies of the Course:

1. Interactive lectures
2. Seminars
3. Exercises and home works
4. Laboratory based session
5. Case studies
6. Team work

VI. Assessment Methods of the Course:

1. Written tests (Mid and Final exams and Quizzes)
2. Assignment
3. Short essays
4. Reports

VII. Assignments:

No.	Assignments	Week Due	Mark
1	**Calculation and interpretation of different red cell indices**	4	2.5
2	**Immunophenotype of developed cell (one lineage)**	10	2.5
Total			

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	**Assignment**	4, 10	10	10
2	**Quizz**	6, 12	10	10
3	**Midterm theory exam**	8	10	10

4	**Midterm practical exam**	9	5	5
5	**Reports and activity in lab**	All lab lessons	5	5
6	**Final practical exam**	14	20	20
7	**Final theory exam**	16	40	40
Total			**100**	**100**

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

33- Hoffbrand A.V. and Moss P.A.H. essential hematology. 6th edition.2011. John Wiley and Sons Ltd. USA.

34- Turgeon M.L. Clinical hematology : theory and procedures. 5th ed. 2012. Lippincott Williams & Wilkins, USA.

2- Essential References:

35- Harmening, Denise M. Clinical Hematology and Fundamentals of Hemostasis. 5th edition 2008. F.A. Davis. Philadelphia.USA

36- Bain B. Blood cells: A practical guid. 4th edition. 2006. Wiley-Blackwell.

37- Greer J.P. Arber D.A. Glader B. Wintrob,s Clinical Hematology. 2013. LWW. USA

38- Harmening D. and Finnegan K. Heme Notes: A Pocket Atlas of Cell Morphology. 2014. F.A. Davis. Philadelphia. USA.

39- Lewis S.M. Bain B.J. Bates I. Dacie and Lewis Practical Haematology' 10th Edition, 2012, Churchill Livingstone Elsevier.

3- Electronic Materials and Web Sites etc.:

Websites:

1. American Society of Hematology (ASH)
https://www.hematology.org/
2. European Hematology Association (EHA)
https://ehaweb.org/
3. International Society on Thrombosis and Haemostasis (ISTH)
https://www.isth.org/
4. British Society for Haematology (BSH)
https://b-s-h.org.uk/

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي

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:**

	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Faculty of ...Medical Laboratory.....

Department of Medical Laboratory

Course Specification of

_____Hormones and Tumor Markers_____

Course No. ( )

2024/2025م

I. Course Identification and General Information:

1	**Course Title:**	Hormones and Tumor Markers--			
2	**Course Code & Number:**	----			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	--2	--	-2-
4	**Study Level/ Semester at which this Course is offered:**	Level--3- / Semester---2-			
5	**Pre –Requisite (if any):**	Biology and Biochemistry 1& 2---			
6	**Co –Requisite (if any):**	Clinical Chemistry 1			
7	**Program (s) in which the Course is Offered:**	Bachelor in Medical Laboratory			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**				
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. –Radwan Al-Hamodi --			
13	**Date of Approval:**				

II. Course Description:

This course is an introduction to the general fundamentals and principles of hormones and endocrine glands concerning their clinical significance for medical laboratory sciences students. Topics include hormone definitions, mechanisms of action, hormonal function, and endocrine glands. Topics also cover the definitions and clinical significance of tumor markers. The course also deals with instrumentation and evaluation of the accuracy and precision of the procedures using analytical techniques. The course is based on lectures as well as seminars, group discussion, lab experiments, Log book, group works, collaborative learning, and Case study. es.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)		**Referenced PILOs (مخرجات تعلم البرنامج)**	
F. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
A1	a1. Recognition of the endocrine system and its hormones, structure of hormones, the function of various	**A1**	Recognize basic sciences pertinent to the medical laboratory

	hormones, their mechanism of actions, and their clinical significance with their diagnostic values..		
A2	a2. Recognize tumor markers of each organ and their clinical significance with their diagnostic values..	**A2.**	Illustrate principles, theories, and fundamental concepts related to specialization
A3	a3. Describe laboratory tests performed to diagnose diseases of endocrine gland, organs and cancer.	**A3**	Apply the knowledge from this course while working in medical laboratory to diagnose different hormone disorders and tumor markers. Apply quality control procedures in the lab
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Integrate and explain laboratory results.	**B1**	Interpret the results of laboratory tests in a scientifically valid explanation.
b2.	Develop competence in problem solving and in using diagnostic techniques to get reliable results.	**B2.**	Verify and Affirm results of laboratory diagnosis
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Use the skills in performing lab tests, identify lab errors and record results	**C1**	Perform the laboratory tests and their report proficiently.
D. Transferable Skills: Upon successful completion of the course, students will be able to:			
d1	Work effectively in a group in a lab or during preparation of seminars and respects the role of staff and co-staff members regardless of degree or occupation.	**D1**	Work alone or within a team efficiently in clinical practice to sustain lifelong learning.

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Recognize enzymes of each organ, mechanism of hormone action and hormones of each gland and tumor markers with their diagnostic values…	▪ Lecture ▪ Interactive class discussions ▪ Problem solving	▪ Written exams ▪ Problem solving assessment
a2	Describe laboratory tests performed to diagnose diseases of endocrine gland, organs and cancer	▪ Lecture ▪ Interactive class discussions ▪ Problem solving	▪ Written exams ▪ Problem-solving assessment
a3	…	▪	▪
a4	…	▪	▪
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1	Integrate and explain laboratory results.	▪ Lecture ▪ Group dissection ▪ Case study	▪ Written exams ▪ Short essay ▪ Case study assessment
b2	Develop competence in problem solving and in using diagnostic techniques to get reliable results	▪ Lecture ▪ Group dissection ▪ Case study	▪ Written exams ▪ Short essay ▪ Case study assessment
b3	…	▪	▪
b4	…	▪	▪
(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
c1	Use the skills in performing lab tests, identify lab errors and record results.	▪ Practical practice ▪ Lab experiments ▪ Log book	▪
c2	Perform calibration for lab instruments, laboratory techniques and equipment to get more accurate result and execute safely lab tests	▪ Practical practice ▪ Lab experiments ▪ Log book	▪ Lab report ▪ Practical Exam ▪ Evaluation of Log book
c3	…	▪	▪
c4	…	▪	▪
(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching			

Strategies and Assessment Methods:			
Course Intended Learning Outcomes		**Teaching Strategies**	**Assessment Strategies**
d1	Work effectively in a group in a lab or during preparation of seminars and respects the role of staff and co-staff members regardless of degree or occupation.	▪ Seminars ▪ Collaborative learning ▪ Field visits	▪ Reports evaluation
d2	…	▪	▪
d3	…	▪	▪
d4	…	▪	▪

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Introduction**	– Understanding the basics pillars of the Endocrine System – -Describe the main differences and Endcorine system signalling – Describe the basic structure and function of the endocrine system – Definition and classification hormones	1	2	a1, a2 b1,b2,c1, c2.
2	**Endocrine glands and Type of hormones**	– -Describing the main functions of the Endocrine system in maintaining homeostasis. – Understanding the difference in the types, synthesis, and characteristics of different types of hormones	1	2	a1, a2 b1,b2, ,c1,c2, d1
3	**Mechanism of hormone action**	– Explain the mechanisms of hormone action and control of their secretion – -Understand the concept of negative and positive feedback mechanisms	1	2	a1, a2 b1,b2, ,c1,c2, d1
4	**Hormones of hypothalamus, and common disorders**	– Describe the structure and function of the hypothalamus – Describing the role of the hypothalamus in regulating	1	2	a1, a2 b1,b2, ,c1,c2, d1

		different parts of the Endocrine system			
5	**Hormones of pituitary gland and common disorders**	– Describe the structure and function of the pituitary gland – Explain the functions of anterior and posterior pituitary hormones – Describe the conditions which lead to abnormal hormone production – Describe and explain the investigation of suspected pituitary dysfunction……	2	4	
6	**Mid-Term Theoretical Exa**	–	1	2	a1, a2 b1,b2, ,c1,c2,
7	**Hormones of thyroid and common disorders.**	– Structure of the thyroid gland – Thyroid hormones – Function of thyroid hormones – Control of thyroid hormone secretion – Disorders of thyroid function – Hyperthyroidism – Hypothyroidism – Laboratory tests to determine the cause of thyroid dysfunction – Interpretation of thyroid function tests	1	2	a1, a2 b1,b2, ,c1,c2, d1
8	**Hormones of adrenal and common disorders.**	– Describe the morphology, development, functions, and regulation of the adrenal glands – Appreciate the value and limitations of measuring adrenal hormones in biological fluids – Discuss the impact of changes in adrenal hormone concentrations under normal and abnormal circumstances, and the interpretation of endocrine tests – Describe the screening and confirmatory tests for adrenal disorders – Discuss the causes, and outcomes, of adrenal disorders	1	2	a1, a2 b1,b2, ,c1,c2, d1
9	**Hormones of**	– Understanding the role of the	1	2	a1, a2

	parathyroid, and common disorders.	parathyroid gland and parathyroid hormone in maintaining Calcium balance – Understand the role of Vitamin D and Calcitonin in maintaining Calcium homeostasis…			b1,b2, ,c1,c2, d1
10	**Hormones of gonads and common disorders.**	– Explain the role of the hormones involved in reproductive endocrinology in the female – Provide an account of the hormonal changes in the menstrual cycle and the control mechanisms involved – Describe how ovulation may be inhibited or induced for therapeutic purposes – Describe the diagnosis of the menopause and the role of hormone replacement therapy – Outline the causes of anovulatory infertility – Discuss the polycystic ovary syndrome, its metabolic consequences, and its management – Outline the hormonal interrelationships in male reproductive function – Discuss the limitations of commonly used hormone assays	2	4	a1, a2 b1,b2, ,c1,c2, d1
11	**Hormones of pancreas and common disorders.**	– Describing the role of the Pancreas with Insulin and Glucagon in regulating glucose levels in the blood…	1	2	a1, a2 b1,b2, ,c1,c2, d1
12	**Tumor markers**	– Learn what is cancer and study the mechanisms of carcinogenesis, learn about role of apoptosis in carcinogenesis. – Learn how cancer cells spread (Biochemistry of metastasis). – Study the different “oncogenic markers” (Tumour markers). – Definition, features – Classification – Application	2	4	a1, a2 b1,b2, ,c1,c2, d1

16	**Final Theoretical Exam**		1	2	a1, a2 b1,b2,c1, c2.
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	Introduction for measurement of hormones: - Sample collection - Source of errors in collecting the hormonal sample - Hormones units and reference ranges - Principle of closed system for hormonal measurement.	1	2	b1,b2,c1,c2, d1
2	- Methods for the determination of hormones in blood: ELIZA, RIA, HPLC, IFA, ECL, and chromatography	1	2	b1,b2,c1,c2, d1
3	- Determination of pituitary hormones: growth hormone, TSH, Prolactin, FSH, LH etc	2	4	b1,b2,c1,c2, d1
4	- Determination of thyroid and parathyroid hormones: T3, T4 and PTH.	2	4	b1,b2,c1,c2, d1
5	- Determination of adrenal gland (cortisol, and aldosterone)	2	4	b1,b2,c1,c2, d1
6	- Determination of pancreas gland (insulin and glucagon)	2	4	b1,b2,c1,c2, d1
7	- Determination of sex hormones: E2, progesterone, DEHA, Testosterone,...etc.	2	4	b1,b2,c1,c2, d1
8	- Determination of Tumor markers (PSA, CA-15.3, AFP)..etc	3	6	b1,b2,c1,c2, d1
9				
10	-			
11	-			

12	-			
13	-			
14	-			
15	-			
16				
Number of Weeks /and Units Per Semester		15	30	

C. Tutorial Aspect:				
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Number of Weeks /and Units Per Semester		15	30	

V. Teaching Strategies of the Course:

lectures with discussion

Seminars

Brainstorming and group discussion

Lab experiments

Log book

Group works

Collaborative learning

Case study

Problem solving

VI. Assessment Methods of the Course:

Quizzes, and Assignments

Exams,

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Qui and Assignments**	3- 13th	**10**	a1,a2,b1,b2,c1,c2
2	**Midterm Exam**	8th	**15**	b1,b2,c1,c2, d1
	Practical Final exam	16th	**30**	b1,b2,c1,c2
3	**Final Exam**	17th	**45**	b1,b2,c1,c2, d1
Total			**100**	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Quiz and Assessments**	3- 13th	10	10%	a1,a2,b1,b2,c1,c2
2	**Midterm Exam**	8th	15	15%	b1,b2,c1,c2, d1
3	**Practical Final exam**	16th	30	30%	b1,b2,c1,c2
4	**Final Exam**	17th	45	40%	b1,b2,c1,c2, d1
5					
6					
Total					

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example
40- Vargatu, I. "Williams textbook of endocrinology." Acta Endocrinologica (Bucharest) 12.1 (2016): 113. 41- Marshall, W. J., Lapsley, M., Day, A., & Shipman, K. (2020). Clinical chemistry. Elsevier Health Sciences., 5th Edition, Mosby Ltd. Churchil Livingston, UK. 42- Rifai, N. (2017). Tietz Textbook of Clinical Chemistry and Molecular Diagnostics-E-Book: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics-E-Book. Elsevier Health Sciences.
2- Essential References:
43- Marshall, W. J., Lapsley, M., Day, A., & Shipman, K. (2020). *Clinical chemistry*. Elsevier Health Sciences., 5th Edition, Mosby Ltd. Churchil Livingston, UK. 44- Vargatu, I. "Williams textbook of endocrinology." Acta Endocrinologica (Bucharest) 12.1 (2016): 113. 45- Bishop, Michael L. Clinical chemistry: Principles, techniques, and correlations, enhanced edition: Principles, techniques, and correlations. Jones & Bartlett Learning, 2020. 46- Rifai, N. (2017). Tietz Textbook of Clinical Chemistry and Molecular Diagnostics-E-Book: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics-E-Book. Elsevier Health Sciences. 47- Philip D Mayne, (1993), Clinical Chemistry in diagnostic and treatment, 6th edition, Edward Arnold, London.
3- Electronic Materials and Web Sites etc.:
Websites: 48- www.sciencedirect.com › book › williams-textboo... 49- www.gettextbooks.com/author/William_J_Marshall 50- www.ccmhmtschool.org/uploads/docs/tietz-fundamentals-of-clinical-chemistry.pdf 51- https://evolve.elsevier.com/cs/product/9780323936941?role=student! 52- www.goodreads.com/book/show/2265851.Tietz_Fundamentals_of_Clinical_Chemistryhttps://www.pinterest.com/pin/310537336786856970/ 53- https://archive.org/details/ClinicalChemistry6thEditionBishop **Journals:** https://academic.oup.com/clinchem www.longdom.org/journal-clinical-chemistry-laboratory-medicine.html **Other Web Sources:** 54- www.sciencedirect.com › book › williams-textboo...

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي	
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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Faculty of Laboratory Medicine

Department of Immunology

Course Specification of

Clinical immunology

Course No. ( )

2025م

I. Course Identification and General Information:

1	**Course Title:**	Clinical immunology			
2	**Course Code & Number:**	----			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	3rd Level / 1st Semester			
5	**Pre –Requisite (if any):**	Immunology, microbiology, hematology, physiology			
6	**Co –Requisite (if any):**	Clincal hematology			
7	**Program (s) in which the Course is Offered:**	Bachelor of laboratory Medicine			
8	**Language of Teaching the Course:**	English			
9	**Study System:**	Regular (semester)			
10	**Mode of Delivery:**	Direct face to face			
11	**Location of Teaching the Course:**	University Campus			
12	**Prepared by:**	Dr. Jamil M.A.S. Obaid			
13	**Date of Approval:**				

II. Course Description:

The clinical immunology course deals with the detailed illustration of the defects in the immune system and response, disease development and the principles of immunoprophylaxis and immunotherapy. The items of this course are disorders of the immune system: hypersensitivity, immunodeficiency, autoimmunity, immune response to infections and tumors and all aspects of immunoprophylaxis. In addition to the practical diagnostic analyses related to these topics. This course focuses on the mechanisms behind the development of immunological diseases and their diagnosis and the applications of immunoprophylaxis strategies.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)

G. Knowledge and Understanding: Upon successful completion of the course, students will be able to:			
a1	Demonstrate knowledge in the etiology, pathophysiology, clinical features and diagnostic procedures of immune-mediated diseases including hypersensitivity, autoimmunity, immunodeficiency and responses to tumors.	**A1**	
a2	Identify the principles and strategies of immune responses to infections, immunoprophylaxis and immunotherapy	**A3**	
B. Intellectual Skills: Upon successful completion of the course, students will be able to:			
b1	Differentially describe the clinical aspects and the laboratory diagnostic methods of various immune-mediated diseases	**B1**	
b2	Utilize his experience knowledge with protective immune responses to identify and develop immunoprophylaxis and immunotherapy plans	**B2**	
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:			
c1	Collect, process and transport valid specimens used to diagnose immune-mediated diseases in accordance with biorisk principles	**C3**	
c2	Perform both immunological and non-immunological diagnostic analyses in clinical immunology using simple and sophisticated techniques according to standard operation procedures.	**C4**	
D. Transferable Skills: Upon successful completion of the course, students will be able to:			

d1	Effectively communicate with patients, colleague and supervisors group working in the laboratory and participate in debates and life-long learning	**D2**	

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a1	Demonstrate knowledge in the etiology, pathophysiology, clinical features and diagnostic procedures of immune-mediated diseases including hypersensitivity, autoimmunity, immunodeficiency and responses to tumors.	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Case studies	▪ Written tests (Mid and Final exams and Quizzes) ▪ Assignment ▪ Short essays
a2	Identify the principles and strategies of immune responses to infections, immunoprophylaxis and immunotherapy	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Case studies	▪ Written tests (Mid and Final exams and Quizzes) ▪ Assignment ▪ Short essays
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1	Differentially describe the clinical aspects and the laboratory diagnostic methods of various immune-mediated diseases	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Case studies ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Assignment ▪ Short essays ▪ Reports
b2	Utilize his experience knowledge with protective immune responses to identify and develop	▪ Interactive lectures ▪ Exercises and home works ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Assignment

	immunoprophylaxis and immunotherapy plans		▪ Short essays

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1	Collect, process and transport valid specimens used to diagnose immune-mediated diseases in accordance with biorisk principles	▪ Interactive lectures ▪ Laboratory based session ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Reports
c2	Perform both immunological and non-immunological diagnostic analyses in clinical immunology using simple and sophisticated techniques according to standard operation procedures.	▪ Interactive lectures ▪ Laboratory based session ▪ Team work	▪ Written tests (Mid and Final exams and Quizzes) ▪ Short essays ▪ Reports

(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1	Effectively communicate with patients, colleague and supervisors group working in the laboratory and participate in debates and life-long learning	▪ Interactive lectures ▪ Seminars ▪ Exercises and home works ▪ Laboratory based session ▪ Team work	▪ Assignment ▪ Short essays ▪ Reports

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	**Allergy (Hypersensitivity reaction type I)**	▪ Definitions of allergy and hypersensitivity ▪ Classification of hypersensitivity reactions ▪ Type I (immediate hypersensitivity) ▪ Allergens ▪ Pathophysiology ▪ Examples (Diseases; systemic and local) ▪ Diagnosis & Treatment	1	2	a1, b1, b2, d1
2	**Hypersensitive Reactions (Types II, III and IV)**	▪ Causes and mechanisms of development ▪ Pathophysiology ▪ Examples (Diseases of each types) ▪ Diagnosis & Treatment	1	2	a1, b1, d1
3	**Immunity against Infections**	▪ Immunity response against viruses ▪ Immunity response against bacteria ▪ Immunity response against fungi ▪ Immunity response against parasites	1	2	a1, a2, b2, d1
4	**Immunoprophylaxis strategies**	▪ Definitions and strategic divisions ▪ Active and passive immunization, examples ▪ Children and adult immunization program in Yemen and USA. ▪ Passive immunization ▪ licensed products	2	2	a1, a2, b2, d1
5	**Vaccines**	▪ Properties of ideal vaccine, ▪ Types of vaccines; whole cell vaccines; (live attenuated and killed vaccines), subunit vaccines; synthetic peptides, recombinant, DNA vaccines, anti-ideotypes , and edible vaccines. ▪ Adjuvants types and mechanism of action	2	4	a1, a2, b2, d1
6	**Immunodeficiency**	▪ Definition and classification ▪ Primary immunodeficiency ▪ Classification, pathophysiology, clinical features, diagnosis and treatment ▪ Secondary immunodeficiency ▪ pathophysiology ▪ HIV and AIDS	2	4	a1, b2, d1
7	**Mid-Term Theoretical Exam**	–	1	2	a1, a2, b2, d1
8	**Autoimmunity**	▪ Tolerance, definitions, types and mechanisms ▪ Autoimmune diseases classifications ▪ causes and susceptibility ▪ systemic autoimmune diseases (SLE & RA) ▪ organ specific autoimmune diseases (MG, GD, AIHA, DM, and thyroid diseases)	3	6	a1, a2, b1, b2, d1

9	**Markers used in autoimmune diseases**	▪ Antinuclear Antibodies ▪ dsDNA Antibodies ▪ Extractable Nuclear Antigens (ENAs) ▪ Phospholipid Antibodies ▪ Antineutrophil Cytoplasmic Antibodies (ANCA) ▪ Myeloperoxidase and Proteinase 3 ▪ Phospholipase A2 Receptor (PLA2R) Antibodies ▪ Thyroid Antibodies (Thyroid peroxidase, TSH-receptor, Thyroglobulin)	2	4	a1, b1, b2, d1
10	**Immunology to tumors**	▪ Immune response to tumor ▪ Immune surveillance ▪ Tumor antigens and markers. ▪ Tumor escape mechanisms	1	2	a1, a2, b1, b2, d1
11	**Final Theoretical Exam**	–	1	2	a1, a2, b1, b2, d1
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:				
No.	**Tasks/ Experiments**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	Samples and instrument used in clinical immunology	1	2	c1, c2, d1
2	Skin prick test for diagnosis of hypersensitivity type I	1	2	a1, b1, c2, d1

3	ELISA test for total antibodies quantitation/IgE	1	2	b1, c1, c2, d1
4	Direct antiglobulin test for diagnosis of hypersensitivity type II	1	2	a1, b1, c1, c2, d1
5	Tuberculin test for hypersensitivity type IV	1	2	a1, b1, c2, d1
6	NBT test for evaluation of phagocytic function	1	2	a1, b1, c1, c2, d1
7	Immunofluorescence testing for Antinuclear antibodies (ANA), ASMA and AMA	1	2	a1, b1, c1, c2, d1
8	Complement assay (C3 & C4)	1	2	a1, b1, c1, c2, d1
9	Midterm practical exam	1	2	a1, b1, c1, c2, d1
10	Rheumatoid arthritis assays (RF and anti-ccp)	1	2	a1, b1, c1, c2, d1
11	Isolation and proliferation test of lymphocytes	1	2	a1, b1, c1, c2, d1
12	Antiphospholipids antibodies analysis	1	2	a1, b1, c1, c2, d1
13	Serum electrophoresis	1	2	a1, b1, c1, c2, d1
14	Final Practical exam	1	2	a1, b1, c1, c2, d1
Number of Weeks /and Units Per Semester		14	28	

C. Tutorial Aspect:				
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**	**Learning Outcomes (CILOs)**
1	NA			

V. Teaching Strategies of the Course:

7. Interactive lectures
8. Seminars
9. Exercises and home works
10. Laboratory based session
11. Case studies
12. Team work

VI. Assessment Methods of the Course:

1. Written tests (Mid and Final exams and Quizzes)
2. Assignment
3. Short essays
4. Reports

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	**Report of published study on one vaccine**	4	2.5	a1, a2, b2, d1
2	**Autoimmune disease diagnosis report**	10	2.5	a1, a2, b1, d1
Total				

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	**Assignment**	4, 10	5	5	a1, a2, b1, b2, d1
2	**Quizz**	6, 12	5	5	a1, a2, b2
3	**Midterm theory exam**	8	10	10	a1, a2, b2, d1
4	**Midterm practical exam**	9	5	5	a1, b1, c1, c2, d1
5	**Reports and activity in lab**	All lab	5	5	b1, b2, c1, c2,

		lessons			
6	**Final practical exam**	14	20	20	a1, b1, c1, c2, d1
7	**Final theory exam**	16	40	40	a1, a2, b1, b2, d1
Total					

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

55- Owen J,A, Punt J, Stranford S,A, Jones P,P, 2019, Kuby immunology. 8th edition. W. H. Freeman and company. USA.

56- Chapel H, Haeney B, Misbah S, Snowden N, (2014) Essentials of Clinical Immunology, 6th ed. by John Wiley & Sons, Ltd, UK.

2- Essential References:

57- Zabriskie, J,B, 2009, Essential Clinical Immunology. 2rd ed . New York: Cambridge University Press.

58- Abbas A,K, Lichtman A,H, Pillai S, 2015, Basic immunology functions and disorders of the immune system.4th ed., Elsevier Saunders. China.

59- Spickett G, P, 2013, Oxford Handbook of Clinical Immunology and Allergy, Third edition, Oxford University Press,UK. \

60- Roitt's Essential Immnuology. 13th edition, Blackwell Science Ltd. Massachusetts. USA.

3- Electronic Materials and Web Sites etc.:

Websites:

1. International Union of Immunlogical Societies
   https://iuis.org/
2. Expert Review of Clinical Immunology
   https://www.tandfonline.com/toc/ierm20/current
3. Immunopaedia: educational website.
   https://www.immunopaedia.org.za/
4. Immunology Videos
   https://www.immunology.utoronto.ca/immunology-videos
5. The British Society for Allergy & Clinical Immunology (BSACI)
   https://www.bsaci.org/
6. National institute of allergy and infectious diseases
   https://www.niaid.nih.gov/
7. European Academy of Allergy & Clinical Immunology
   www.eaaci.org

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي	
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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Second Part of Course Specification

Faculty of Laboratory Medicine

Department of Immunology

Course Plan (Syllabus) of Clinical immunology

Course No. (…….)

2025م

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:							
Location& Telephone No.:							
E-mail:		SAT	SUN	MON	TUE	WED	THU
Office Hours							

I. Course Identification and General Information:					
	Course Title:	Clinical immunology			
2	**Course Code & Number:**	----			
3	**Credit Hours:**	**Credit Hours**	**Theory Hours**		**Lab. Hours**
			Lecture	**Exercise**	
		3	2	--	2
4	**Study Level/ Semester at which this Course is offered:**	3rd Level / 1st Semester			
5	**Pre –Requisite (if any):**	Immunology, microbiology, hematology, physiology			
6	**Co –Requisite (if any):**	Clincal hematology			
7	**Program (s) in which the Course is Offered:**	Bachelor of laboratory Medicine			

8	**Language of Teaching the Course:**	English
9	**Study System:**	Regular (semester)
10	**Mode of Delivery:**	Direct face to face
11	**Location of Teaching the Course:**	University Campus
12	**Prepared by:**	Dr. Jamil M.A.S. Obaid
13	**Date of Approval:**	

II. Course Description:

The clinical immunology course deals with the detailed illustration of the defects in the immune system and response, disease development and the principles of immunoprophylaxis and immunotherapy. The items of this course are disorders of the immune system: hypersensitivity, immunodeficiency, autoimmunity, immune response to infections and tumors and all aspects of immunoprophylaxis. In addition to the practical diagnostic analyses related to these topics. This course focuses on the mechanisms behind the development of immunological diseases and their diagnosis and the applications of immunoprophylaxis strategies.

III. Course Intended Learning Outcomes (CILOs): (مخرجات تعلم المقرر)

A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:	
a1	Demonstrate knowledge in the etiology, pathophysiology, clinical features and diagnostic procedures of immune-mediated diseases including hypersensitivity, autoimmunity, immunodeficiency and responses to tumors.
a2	Identify the principles and strategies of immune responses to infections, immunoprophylaxis and immunotherapy
B. Intellectual Skills: Upon successful completion of the course, students will be able to:	
b1	Differentially describe the clinical aspects and the laboratory diagnostic methods of various immune-mediated diseases
b2	Utilize his experience knowledge with protective immune responses to identify and develop immunoprophylaxis and immunotherapy plans
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:	
c1	Collect, process and transport valid specimens used to diagnose immune-mediated diseases in accordance with biorisk principles

c2	Perform both immunological and non-immunological diagnostic analyses in clinical immunology using simple and sophisticated techniques according to standard operation procedures.
D. Transferable Skills: Upon successful completion of the course, students will be able to:	
d1	Effectively communicate with patients, colleague and supervisors group working in the laboratory and participate in debates and life-long learning

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	**Allergy (Hypersensitivity reaction type I)**	▪ Definitions of allergy and hypersensitivity ▪ Classification of hypersensitivity reactions ▪ Type I (immediate hypersensitivity) ▪ Allergens ▪ Pathophysiology ▪ Examples (Diseases; systemic and local) – Diagnosis & Treatment	1	2
2	**Hypersensitive Reactions (Types II, III and IV)**	▪ Causes and mechanisms of development ▪ Pathophysiology ▪ Examples (Diseases of each types) – Diagnosis & Treatment	1	2
3	**Immunity against Infections**	▪ Immunity response against viruses ▪ Immunity response against bacteria ▪ Immunity response against fungi – Immunity response against parasites	1	2
4	**Immunoprophylaxis strategies**	▪ Definitions and strategic divisions ▪ Active and passive immunization, examples ▪ Children and adult immunization program in Yemen and USA. ▪ Passive immunization – licensed products	2	2
5	**Vaccines**	▪ Properties of ideal vaccine, ▪ Types of vaccines; whole cell vaccines; (live attenuated and killed vaccines), subunit vaccines; synthetic peptides, recombinant, DNA vaccines, anti-ideotypes , and edible vaccines. – Adjuvants types and mechanism of action	2	4
6	**Immunodeficiency**	▪ Definition and classification ▪ Primary immunodeficiency ▪ Classification, pathophysiology, clinical features, diagnosis and treatment ▪ Secondary immunodeficiency ▪ pathophysiology HIV and AIDS	2	4

7	**Mid-Term Theoretical Exam**	–	1	2
8	**Autoimmunity**	▪ Tolerance, definitions, types and mechanisms ▪ Autoimmune diseases classifications ▪ causes and susceptibility ▪ systemic autoimmune diseases (SLE & RA) – organ specific autoimmune diseases (MG, GD, AIHA, DM, and thyroid diseases)	3	6
9	**Markers used in autoimmune diseases**	▪ Antinuclear Antibodies ▪ dsDNA Antibodies ▪ Extractable Nuclear Antigens (ENAs) ▪ Phospholipid Antibodies ▪ Antineutrophil Cytoplasmic Antibodies (ANCA) ▪ Myeloperoxidase and Proteinase 3 ▪ Phospholipase A2 Receptor (PLA2R) Antibodies – Thyroid Antibodies (Thyroid peroxidase, TSH-receptor, Thyroglobulin)	2	4
10	**Immunology to tumors**	▪ Immune response to tumor ▪ Immune surveillance ▪ Tumor antigens and markers. – Tumor escape mechanisms	1	2
11	**Final Theoretical Exam**	–	1	2
Number of Weeks /and Units Per Semester			**16**	**32**

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	Samples and instrument used in clinical immunology	1	2
2	Skin prick test for diagnosis of hypersensitivity type I	1	2
3	- ELISA test for total antibodies quantitation/IgE	1	2
4	- Direct antiglobulin test for diagnosis of hypersensitivity type II	1	2
5	- Tuberculin test for hypersensitivity type IV	1	2
6	- NBT test for evaluation of phagocytic function	1	2
7	- Immunofluorescence testing for Antinuclear antibodies (ANA), ASMA and AMA	1	2
8	- Complement assay (C3 & C4)	1	2

9	Midterm practical exam	1	2
10	- Rheumatoid arthritis assays (RF and anti-ccp)	1	2
11	- Isolation and proliferation test of lymphocytes	1	2
12	- Antiphospholipids antibodies analysis	1	2
13	- Serum electrophoresis	1	2
14	- Final Practical exam	1	2
Number of Weeks /and Units Per Semester		15	30

C. Tutorial Aspect:			
No.	**Tutorial**	**Number of Weeks**	**Contact Hours**
1	NA		

V. Teaching Strategies of the Course:

1. Interactive lectures
2. Seminars
3. Exercises and home works
4. Laboratory based session
5. Case studies
6. Team work

VI. Assessment Methods of the Course:

1. Written tests (Mid and Final exams and Quizzes)
2. Assignment
3. Short essays
4. Reports

VII. Assignments:

No.	Assignments	Week Due	Mark

1	**Report of published study on one vaccine**	4	2.5
2	**Autoimmune disease diagnosis report**	10	2.5
Total			

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	**Assignment**	4, 10	5	5
2	**Quizz**	6, 12	5	5
3	**Midterm theory exam**	8	10	10
4	**Midterm practical exam**	9	5	5
5	**Reports and activity in lab**	All lab lessons	5	5
6	**Final practical exam**	14	20	20
7	**Final theory exam**	16	40	40
Total			**100**	**100**

IX. Learning Resources:

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

1- Required Textbook(s) (maximum two): مثال example

61- Owen J,A, Punt J, Stranford S,A, Jones P,P, 2019, Kuby immunology. 8th edition. W. H. Freeman and company. USA.

62- Chapel H, Haeney B, Misbah S, Snowden N, (2014) Essentials of Clinical Immunology, 6th ed. by John Wiley & Sons, Ltd, UK.

2- Essential References:

63- Zabriskie, J,B, 2009, Essential Clinical Immunology. 2rd ed . New York: Cambridge University Press.

64- Abbas A,K, Lichtman A,H, Pillai S, 2015, Basic immunology functions and disorders of the

immune system.4th ed., Elsevier Saunders. China.
65- Spickett G, P, 2013, Oxford Handbook of Clinical Immunology and Allergy, Third edition, Oxford University Press,UK. \
66- Roitt's Essential Immnuology. 13th edition, Blackwell Science Ltd. Massachusetts. USA.

3- Electronic Materials and Web Sites etc.:

Websites:

1. International Union of Immunlogical Societies
https://iuis.org/
2. Expert Review of Clinical Immunology
https://www.tandfonline.com/toc/ierm20/current
3. Immunopaedia: educational website.
https://www.immunopaedia.org.za/
4. Immunology Videos
https://www.immunology.utoronto.ca/immunology-videos
5. The British Society for Allergy & Clinical Immunology (BSACI)
https://www.bsaci.org/
6. National institute of allergy and infectious diseases
https://www.niaid.nih.gov/
7. European Academy of Allergy & Clinical Immunology
www.eaaci.org

X. Course Policies: (Based on the Uniform Students' By law (2007)تترك كما هي

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:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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.

Republic of Yemen

University: Jiblah University for Medical and Health Sciences

Faculty : Medical Laboratory Sciences

Title of the Program: BSc. Medical Laboratory

Title of the Course: Hormones

الجمهورية اليمنية

جامعة جبلة للعلوم الطبية والصحية

كلية: المختبرات الطبية

اسم البرنامج: بكالوريوس مختبرات طبية

عنوان المقرر: هرمونات

Course Specification of Hormones

I. Course Identification and General Information:				
1	**Course title:**	**Hormones**		
2	**Course code and number:**	**CM.PHYSIO.4212**		
3	**Credit Hours:**	**C.H.**		**Total**
		Theory	**Practical**	
		2	**1**	**3**

4	**Level/year at which this course is offered:**	**4th year / 1st semester**
5	**Pre –requisite (if any):**	**Biochemistry(1) (CHL.CHEM. 2210), Biochemistry(2) (CHL.CHEM. 2211) and Physiology (CM.PHYSIO.2111)**
6	**Co–requisite:**	**-**
7	**Program (s) in which the course is offered:**	**B.Sc. Medical Laboratory**
8	**Language of teaching the course:**	**English**
9	**Location of teaching the course:**	**Faculty of Medical Laboratory Sci.**
10	**Prepared By:**	**Ebraheem A. Al-Nawd (MSc. Clinical Biochemistry "Hormones")**
11	**Date of Approval**	**……**

II. Course Description:

This course is designed to give the students a basic knowledge about human endocrinology and hormonology topics as well as tumor markers; to enable them to have the necessary concepts and the capability to perform hormonal and tumor markers analyses along with their clinical significance.

It comprises the general physiology of endocrine glands, and the physiochemical properties and functions of hormones, and their alterations with emphasis on the related laboratory analytical methods and interpretations. In addition, properties, biochemistry, laboratory analyses and clinical significance of various tumor markers will be covered in this course.

III. Intended Learning Outcomes (ILOs) of the Course:

By the end of the course, students should be able to:

A. Knowledge and Understanding:

A1. Explain the principle of cell signaling, cell communication, signal transduction processes and the main differences between endocrine and nervous system signaling.

A2. Identify the functions of the different glands, hormones and their roles in maintaining homeostasis and regulating body processes.

A3. Recognize the basic knowledge of the properties, biosynthesis, chemistry, classification, storage, transport, and mechanism of secretion and action of various hormones, and their clinical significance.

A4. Discuss the concept of feedback regulation and the function of the various hypothalamic–pituitary–endocrine target gland loops.

A5. Describe the pathophysiology of endocrine system dysfunction.

A6. Define the tumors and their general physiochemical properties.

A7. Name the major tumor types and their associated markers.

A8. State the properties and biochemical nature of tumor markers and the clinical significance of their investigations.

A9. Provide basic information about different analytical methods of hormones and tumor makers and units of measurements.

B. Intellectual Skills:

B1. Classify hormones according to their chemical nature and biological role.

B2. Interpret symptoms, signs and laboratory results of case studies of endocrine disorders in accordance with their clinical significance (primary vs. secondary).

B3. Correlate the endocrine disorders and the malignant diseases with their underlying pathophysiological, biochemical and molecular mechanisms.

B4. Differentiate the normal and abnormal results of some hormones and tumor markers investigations.

B5. Compare the various methodologies used in hormones and tumor markers laboratory analysis.

C. Professional and Practical Skills:

C1. Recognize laboratory techniques, reagents and instruments used in the hormonal and tumor markers analyses.

C2. Perform some immunochemical estimation of some important hormonal and tumor markers tests (serum levels of LH, FSH, TSH, T3, T4, E_2, B-HCG, PSA, CA 125, ….).

C3. Write correct meaningful reports for the hormonal and tumor markers results.

C4. Carry out sampling process and quality control and assurance procedures for the methods of evaluation of hormones and tumor markers.

D. General and Transferable Skills:

D1. Work effectively in a team in lab, class activities or during preparation of seminars.

D2. Communicate with the staff and co-staff members irrespective of degree or occupation and respect

their role.

D3. Collect information from different sources.

D4. Present information accurately and clearly in diverse forms.

D5. Display the skills of solving scientific and clinical problems.

D6. Develop the skills of self-learning and scientific research conducting.

D7. Show great ethics and adequate proficiency in overall their medical practice.

IV. Course Content:

Time plan:

Hours / Years	Contact hours			
	Theoretical	Practical		
2nd year	2 hrs.	2 hrs.		

A. Biochemistry Course Plan (Syllabus):

Weeks	Credit hours	Topics list
1	2	**Introduction and general properties of hormones:** - Definitions: hormone, endocrine, endocrinology, releasing factor/hormone, tropic hormone, effector (non-tropic) hormone. - Types of chemical messenger (signaling) - Organs of endocrine system. - General functions of hormones. - Chemical classification of hormones (hormone structures). - Regulation of hormone secretion, neural- endocrine control, hormonal axis and feedback regulation.
2	2	**Introduction and general properties of hormones (Cont'd):** - Circulation and transport of hormones in blood. - Mechanism of hormones action in the cell: receptors, hormone-receptor interaction, second messengers (cAMP, GMP, Ca++), protein kinase cascade and signal transduction, regulation of gene expression by hormones. - Factors that affect hormone levels other than endocrine diseases: physiological (e.g., age, gender, menstrual cycle, pregnancy and lactation,

		menopause, diurnal variation, stress, food intake/diet, obesity, …,) and drugs.
3	**2**	**Hypothalamus and Pineal glands:** - Definition, location, structure, functions and regulation of the glands. - Chemical nature, biological role, regulation of secretion, mechanism of action of hypothalamus hormones (e.g. GnRH, TRH, GHIH, GHRH, …) and pineal gland hormones (Melatonin, Serotonin).
4	**2**	**Pituitary gland:** - Definition, location, structure, functions and regulation of the gland. - Interior pituitary gland hormones: chemical nature, biological role, regulation of secretion, mechanism of action, clinical significance (indication) and interpretation of GH, PRL, LPH, ACTH.
5	**2**	**Pituitary gland (Cont'd):** - Chemical nature, biological role, regulation of secretion, mechanism of action, clinical significance (indication) and interpretation of: ✓ LH, FSH, TSH. ✓ Posterior pituitary gland hormones: Hormones of neurohypophysis (Oxytocin, Antidiuretic hormone). ✓ Intermediate pituitary lobe hormone: MSH.
6	**2**	**Thyroid gland:** - Definition, location, structure, functions and regulation of the gland. - Chemical nature, biological role, regulation of secretion, mechanism of action and feedback regulation, clinical significance (indication) and interpretation of thyroid hormones (T3, T4). - Hormonal related disorders: primary vs. secondary hyper/hypothyroidism (Grave's disease, Hashimoto's thyroiditis, myxedema, cretinism, etc.).
7	**1**	**Thyroid gland (Cont'd):** - Case studies of primary and secondary hyper/hypothyroidism. - Chemical nature, biological role, regulation of secretion, mechanism of action, clinical significance (indication) and interpretation of calcitonin.
	1	**- Parathyroid gland:** - Definition, location, structure, functions and regulation of the gland. - Chemical nature, biological role, regulation of secretion, mechanism of action, clinical significance (indication) and interpretation of PTH.

8	**1**	**Case studies**
	1	**Midterm exam**
9	**2**	**Adrenal gland:** - Definition, location, structure, functions and regulation of the gland. - Chemical nature, biological role, regulation of secretion, mechanism of action and feedback regulation, clinical significance (indication) and interpretation of cortex hormones: mineralocorticoids, glucocorticoids, cortical sex hormones, and medulla hormones. - Hormonal related disorders: Cushing disease/syndrome, Addison's disease, pheochromocytoma.
10	**2**	**Female gonads:** - Review for female reproductive system structure and physiology: ✓ Definition, location, structure, functions and regulation of the female gonads. ✓ Physiological changes and hormonal control of puberty, menstrual cycle, pregnancy and menopause.
11	**2**	**Female Gonads (Cont'd):** - Chemical nature, biological role, regulation of secretion, mechanism of action, clinical significance (indication) and interpretation of estrogen progesterone, B-HCG, Placental lactogenic hormone, anti- Moller hormone, 17-hydroxyprogesterone. - Hormonal related disorders: infertility and ovulation disorders, PCOS, virilism, hirsutism, etc.
12	**2**	**Male Gonads:** - Definition, location, structure, functions and regulation of the male gonads. - Review for male reproductive system structure and hormonal control of puberty, spermatogenesis and andropause. - Chemical nature, biological role, regulation of secretion, mechanism of action and feedback regulation, clinical significance (indication) and interpretation of testosterone and other androgens, SHBG. - Hormonal related disorders: infertility and hypogonadism, impotence, etc.
13	**2**	**Other (non-endocrine) hormones:** - Site of secretion, chemical nature, functions and main alterations (if any) of some hormones produced from**:**

		✓ Pancreas: (insulin, glucagon) ✓ Stomach: (gastrin, secretin, ghrelin) ✓ Duodenum: (cholecystokinin) ✓ Liver: (IGF, thrombopoietin, angiotensinogen and angiotensin) ✓ Kidney: (erythropoietin, thrombopoietin, renin, cacitriol) ✓ Heart: (ANP, BNP) ✓ Adipose tissue: (liptin) ✓ Striated muscles: (thrombopoietin) ✓ Skin: (calcidiol)
14	**2**	**Tumor markers:** - Definitions: (Tumors and malignant diseases, cancer, neoplasms, carcinoma, adenoma, metastasis, mutagens, oncogene, carcinogens, …). - Etiology and risk factors of cancers. - Review of cell cycle: Phases and check points, apoptosis, role of P53. - Growth factors: definition, general properties, functions, classification, and their role in cancers. - Mechanism and characteristics of growing tumor cells: molecular and biochemical changes.
15	**2**	**Tumor markers (Cont'd):** - Tumor Markers: definition, clinical applications, chemical classification with examples, properties of an ideal tumor marker. - Major properties, methods of analysis, and clinical use of: carcinoembryonic antigen (CEA), α-fetoprotein (AFP), prostatic acid phosphatase (PAP), prostate-specific antigen (PSA), beta- human chorionic gonadotropin (β-HCG), vanillyl mandelic acid (VMA), lactate dehydrogenase (LDH), bladder tumor antigen (BTA), tumor markers in myeloma, cancer antigens: CA 15-3, CA 125, CA 19-9, CA 50, …etc.
16	**2**	**Final exam**
16	**32**	**Number of Weeks / and Units Per Semester**

B – Practical Aspect

Weeks	Credit hours	Practical list
1	**1**	- Concepts of hormones assay

		- Analytical methods and instruments used in hormones and tumor markers tests
2	**1**	- Estimation of serum GH before and after stimulation
3	**1**	- Estimation of serum PRL
4	**1**	- Estimation of serum LH
5	**1**	- Estimation of serum FSH
6	**1**	- Estimation of serum TSH
7	**1**	- Estimation of serum T3, T4
8	**1**	- Estimation of serum E2
9	**1**	- Estimation of serum B-HCG
10	**1**	- Estimation of serum total testosterone
11	**1**	- Estimation of serum Alpha feto-protein (AFP)
12	**1**	- Estimation of serum Prostate specific antigen (PSA)
13	**1**	- Estimation of serum CA-15-3
14	**1**	- Visit to the Biochemistry lab in the university hospital to identify the modern sophisticated instruments used in hormones and tumor markers tests
15	**1**	**Final exam**
15	**15**	**Number of Weeks / and Units Per Semester**

V. Teaching Strategies of the Course:

1. Teaching and learning methods:

- Interactive lectures discussion using board, data show and video presentation.
- Small group discussions.
- Individual and collective duties (problem based learning method, assignments and seminars) to encourage self-directed learning.
- Practical bench work and writing reports.
- Vest to a modern Biochemistry lab supplied with more sophisticated instruments used in hormones and tumor markers tests.

2. Assessment tools:

I. Student assessment methods

Continuous assessments:

- Attendance criteria; the minimal acceptable attendance is ≥ 75%.

- Written exam (according to the assessment guidelines predetermined by the faculty).

- Practical exam.

II. Time schedule: faculty by law

Distributed as follows:

No	Exam	Tim	Mark %	
			Theoretical	Practical
1	Attendance criteria and activity	Not predetermined	**5**	**2.5**
2	Quiz exam	Not predetermined	**5**	**2.5**
3	Mid-term exam	Held in the 8th week	**15**	**-**
4	Final term exam	End of semester	**45**	**25**
Total			**70**	**30**
			100	

VI. Learning Resources:

- List of references:

A. Essential Books (Text books):

1. ***Bishop ML, Fody EP & Schoeff L,*** (2010), Clinical Chemistry: Techniques, Principles, Correlations, 6th edition, Lippincott Williams & Wilkins, Baltimore.

2. ***Goodman HM,*** (2009), Basic medical endocrinology, 4th edition. Elsevier Inc. London.

B. Recommended Books:

1. ***Vasudevan DM, Sreekumari S, Vaidyanathan K***, (2011), Textbook of Biochemistry for Medical Students, 6th edition, Jaypee Brothers, New Delhi.

2. ***Hall JE,*** (2006), Guyton and Hall Textbook of Medical Physiology, 11th edition, W B Saunders and Company.

3. ***Martin A. Crook,*** (2012), Clinical Biochemistry & Metabolic Medicine, 8th edition, Hodder & Stoughton Ltd. London.

4. ***Arneson W & Brickell JFA,*** (2007), Clinical Chemistry: A Laboratory Perspective, Davis Company, Philadelphia.

5. ***Burtis CA, Ashwood ER, Bruns DE,*** (2008), Tietz Fundamentals of Clinical Chemistry, 6th edition PA: W.B. Saunders, Philadelphia.

6. ***Hall JE, Nieman LK,*** (2003), Handbook of Diagnostic Endocrinology, Humana Press Inc. Totowa, New Jersey.

C. Periodicals, Web Sites, etc.:

- Search by Google link web site.

Course coordinator:

Ebraheem Ali Al-Nawd
MSc. Clinical Biochemistry (Hormones)

1. Course Identification and General Information						
1	Course Title	**Epidemiology & Infectious disease Control**				
2	Course Number& Code	ك.ط.كاد3124				
3	Credit Hours	Theoretical	Seminar	Training	Evaluation	Total
		2	-	-	-	2
4	Study level/ year at which this course is offered :	4th Level / First semester				
5	Pre – requisite (if any):	Biostatistics				
6	Co – requisite (if any)	No co-requisites				
7	Program (s) in which the Course is offered :	B.Sc. Medical Laboratory Sciences				
8	Language of teaching the Course:	English/Arabic Language				
9	Location of teaching the Course	Jibla University For Medical & Health Sciences				
10	Prepared By :	Dr. Sadiq Q. Al-Mohani				
11	Approved By :					

I. Course Description:

This course is designed to introduce students to the background, basic principles and methods of public health epidemiology, as will as, discuss the biological, behavioral, socio-cultural and environmental factors associated with the etiology and distribution of health and disease.

Topics covered in this course include, measuring of the disease frequency, epidemiologic study designs (experimental and observational) and outbreak investigations in addition to screening, causality, and ethical issues in epidemiologic research.

From this course, students will gain knowledge to understanding the natural history of diseases and epidemiology of chronic and infectious diseases.

II. Linking Learning Outcome to Teaching and Evaluation Strategies:-

First: Knowledge and understanding

Student will able to:

	Learning Outcome / knowledge and Understanding	Teaching Strategies	Evaluation Strategies
1a	Describe historical roots of epidemiology and the concepts and application of epidemiology in public health.	Advance Lecture	Exams
2a	Describe the different types of descriptive epidemiologic studies and analytic studies	Advance Lecture Exercise	Exams & Student Presentation

3a	Discus natural history of disease	Advance Lecture Group work	In-class Activities and Discussions
4a	Identify public health problems in terms of place, time, and person.	Advance Lecture Group work	In-class Activities and Discussions

Second: Intellectual Skills

Student will able to:

	Learning Outcome/ Intellectual Skills	**Teaching Strategies**	**Evaluation Strategies**
1b	Use the concept and principles of epidemiology for define actual satiation in his area	Interactive group Discussion	In-class Activities and Discussions
2b	Differentiate between of epidemiological study designs	Interactive group Discussion	In-class Activities and Discussions
3b	Critique the study design, variables, confounders, in epidemiological studies	Interactive group Discussion	In-class Activities and Discussions
4b	Evaluate, propose and design intervention, prevention, and control strategies for diverse infectious disease problems in various settings	Lectures Presentation	Exams & Student Presentation

Third: Professional Practical Skills

Student will able to:

	Learning Outcome/ Professional Practical Skills	**Teaching Strategies**	**Evaluation Strategies**
1c	Calculate basic epidemiology measures	Lecture Group work	In-class Activities and

		Exercises	Discussions
2c	Evaluate the strengths and limitations of epidemiologic reports.	Interactive group Discussion	In-class Activities and Discussions
Fourth : General and Transferable Skills **Student will able to:**			
Learning Outcome/ General and Transferable Skills		**Teaching Strategies**	**Evaluation Strategies**
1d	Apply epidemiologic method to identify health problems, formulate hypotheses, set study design, analyze data, and interpret results	Interactive group discussion	Evaluation of group discussion
2d	Share the in the epidemiological survey.	Interactive group discussion	Evaluation of group discussion

III. Writing primary and sub course Subjects (Theoretical – practical) and linking them with course Intended learning outcome:-

First : Theoretical part :-

No.	Units / Course Topics	Detailed Topics	No. of weeks	Created Hours
1		• Course description • Course overview • Basic concepts of epidemiology ▪ Definition, scope and trends..	1	1
		• History and development of modern epidemiology • Contribution of epidemiology • Uses of epidemiology		1
		• Terminology (with examples): ▪ Endemic disease ▪ Hyperendemic disease ▪ Holoendemic disease ▪ Epidemic disease ▪ Pandemic disease ▪ Epizootic disease	2	1
2	**Epidemiological approaches**	• Natural history of disease ▪ Case definition ▪ Chain of causation ▪ Surveillance and investigation		1
		• Prevention (Levels) and Control • Classifications of disease ▪ Communicable diseases ▪ Non-communicable diseases	3	1
		• Modes of disease transmission • Communicable disease prevention and control		1
3	**Epidemiologic studies**	• Observational studies ▪ Definition ▪ Uses ▪ Components of Observational studies	4	1
		• Descriptive epidemiology ▪ Definition ▪ Uses ▪ The basic triad		1
		• Analytic epidemiology ▪ Definition & Uses ▪ The basic triad (host, agent and Environment)	5	1

		▪ Typical study design ✓ Cohort study and ✓ Case-control study ✓ Cross-sectional study		1
		• Describe the differences between descriptive and analytic studies,	6	1
		▪ Experimental studies in epidemiology: ▪ Experimental designs ▪ Designing a Randomized Controlled Trial (RCT)		1
		▪ Double-Blind study ▪ Pilot study ▪ Ethics in experimental research	7	1
Mid Term Exam.				1
4	**Measuring disease occurrence**	• Population (definition & types) • Measuring disease occurrence ▪ Ratios, ▪ Proportions, ▪ Rates	8	1
5	**Measuring disease frequency**	• Prevalence ▪ Prevalence definition ▪ Prevalence rate, ▪ Types of Prevalence rate ▪ Clinical significance		1
		• Incidence ▪ Incidence definition ▪ Incidence rate, ▪ Clinical significance ▪ Cumulative Incidence rate ▪ Relationship Between Prevalence & Incidence	9	1
6	**Measuring disease frequency (Cont.)**	▪ Mortality rate ✓ Infant mortality rate ✓ Child mortality rate ✓ Maternal mortality rate		1
		▪ Morbidity rate ▪ Others	10	1
7	**Causality**	• Causal association • Hypothesis development and testing		1
		• Chance, bias, and confounding • Causal inference • Causal criteria	11	1
	Infectious disease Epidemiology	• Concepts of infectious diseases • Epidemiology and Control of Malaria • Epidemiology of Viral Hepatitis		1

		• Epidemiology and Control of S.T.D. • Epidemiology and Control of Tuberculosis	12	1
		• Influenza: Disease, Epidemics and Pandemics • Corona viruses		1
		• Investigation of infectious diseases • Burden of infectious diseases and preventive strategies	13	1
9	**Chronic Disease Epidemiology**	• Chronic disease • The Environment and Chronic health problems • Behavior and chronic health problems • Heredity and chronic health problems		1
	Clinical Epidemiology	• Screening and diagnosis	14	1
		• Validity, reliability, and yield		1
10		• Evaluating the screening test	15	1
	Revision			1
	Final Exam.		16	2
Total				32

V. Teaching Strategies:-

Advance Lecture
Exercise

Group work

Interactive group Discussion

VI. Activities:-

No.	Activity	Learning outcome	Week	Mark
1	**Exercises & home work**		Weekly	5
2	**Quizzes**			5
3	**Written exam (1)**		Mid term	20
4	**Written exam (2)**		Final term	60

VII . Learning Evaluation :-					
No.	**Evaluation Activates**	**Week**	**Marks**	**Degree ratio to degree of the final evaluation**	**Outcome**
1	**Assignment**	**5**			
2	**First Exam (Pop Quiz)**	**5**			
3	**Med Term Exam**	**20**			
4	**Third Exam (Score Improvement) (Attendance)**	**`10**			
5	**Final Term Exam**	**60**			

IX . Learning Resources :-	
No	
1	Park's Text Book Of Preventive And Social Medicine : 26th edition (2021)
2	Aschengrau, A., & Seage III, G. Essentials of Epidemiology in Public Health. Jones and Bartlett Publisher, LLC. 2nd edition (2008)
3	Botina, R., Beaglehole, R, Kjellstrom, T. *Basic Epidemiology*. Geneva: World Health Organization. 2nd Edition (2006).
4	Merrill, R., M.). *Introduction to Epidemiology*. Burlington: Jones and Bartlett Learning. 6th edition (2013).

2. Course Identification and General Information		
1	Course Title	Laboratory quality management
2	Course Number& Code:	ك.طب.ب.4253

3	Credit Hours :	Theoretical	Seminar	Training	Evaluation	Total
		2		1		3
4	Study level/ year at which this course is offered :	4 Level /2 Semester				
5	Pre – requisite (if any):	ك.مخ.عدا227 (Introduction into medical laboratories)				
6	Co – requisite (if any					
7	Program (s) in which the Course is offered :	Medical Laboratory Sciences				
8	Language of teaching the Course:	English/Arabic Language				
9	Location of teaching the Course					
10	Prepared By :	Professor Dr. Hafiz A Al-Nood Professor of Hematology PhD (UK), MSc, CLS (USA) Department of Hematology Faculty of Medicine and Health Sciences Sana'a University				
11	Approved By :					

II. Course Description :

The course is concerned with the fundamentals of clinical laboratory management and quality assurance knowledge regarding to principles and function of management, objectives, organization structure, safety, quality assurance and quality control of clinical laboratory. The practical will include applying the procedures of quality assurance and quality control on laboratory tests.

III. learning Outcomes :			
S	Intended learning outcome of the program that the course contributes to achieving	S	
1	Demonstrate and understanding of fundamental knowledge of biomedical sciences	1	
2	Analyze and evaluate evidence-based information needed in Laboratory medicine practice.	2	
3	Apply technical skills in using laboratory equipment, tools, and materials in laboratory practice.	3	
4	Conduct research projects in the field of Laboratory medicine with sense of social responsibility	4	

IV. Linking Learning Outcome to Teaching and Evaluation Strategies :-

First : Knowledge and understanding

	Learning Outcome / knowledge and Understanding	Teaching Strategies	Evaluation Strategies
1a	Define scientific terms that related to laboratory management and quality assurance	▪Interactive lectures ▪Self-learning	▪Written examination ▪Quizzes ▪Homework
2a	Identify general laboratory techniques, procedures and safet	▪Interactive lectures ▪Presentation	▪ Written examination ▪MCQ exam
3a			
4a			

5a			

Second : Intellectual Skills

	Learning Outcome/ Intellectual Skills	Teaching Strategies	Evaluation Strategies
1b	Recognize basic biomedical statistics and how to apply in laboratory practice and research	▪Interactive lectures ▪Self-learning ▪Brain storming	▪Quizzes ▪Assignments ▪ Writing and MCQ exam
2b	Integrate different methodology and how to assess their performance	▪Interactive lectures ▪Self-learning ▪Brain storming	Quizzes ▪Assignments ▪ Writing and MCQ exam
3b			
4b			
5b			

Third : Professional Practical Skills

Learning Outcome/Professional Practical Skills		Teaching Strategies	Evaluation Strategies
1c	Apply quality assurance in laboratory practice.	▪ Laboratory demonstrations ▪ Laboratory practice ▪ Presentations and group discussion	▪ Technical or practical medical reports/ presentations ▪Individual and group project work
2c	Conduct safety measur clinical laboratory	▪ Lectures ▪ Exercises in labs and ▪Seminars ▪ Lab tutorials and hospital sessions	▪ Technical or practical medical reports/ presentations Individual and group project work
3c			
4c			
5c			

Fourth : General and Transferable Skills

Learning Outcome/ General and Transferable Skills		Teaching Strategies	Evaluation Strategies
1d	Assess all aspects of health a safety requirements for clinical laboratories	▪Discussion ▪ Self-learning ▪Presentation	▪Homework ▪ Evaluation of achievement of group discussion

2d	Evaluate structural reports a technical procedures applied in the clinical laboratory in accorc with the standard scientific guidelines.	Discussion ▪ Self-learning ▪Presentation	▪Homework ▪ Evaluation of achievement of group discussion
3d			
4d			
5d			

V. Writing primary and sub course Subjects (Theoretical – practical) and linking them with course Intended learning outcome :-

First : Theoretical part :-

No.	Units / Course Topics	Detailed Topics	No. of weeks	Actual Hours
1	Introduction	Definition of management, clinical laboratory, quality assurance and quality control and their overall roles in health services	1	2
2	Management	▪ Goals ▪Management process (planning, implementation, evaluation) ▪Management concept	1	2

3	Clinical laboratory management and organization	General principles and function of clinical laboratory management. Clinical laboratory (classification, goals, organization structure, personnel)	1	2
4	Clinical laboratory safety	Importance of safety Safety measures (safe building designed and organized, safe use of equipment and reagent storage) Elements of laboratory safety program Source of laboratory hazards (physical, chemical, biological) Preventing laboratory infection	1	2
5	Laboratory equipment	Equipment selection, maintenance, process of troubleshooting and repair	1	2
6	Quality assurance (QA)	Definition and purpose QA program aspects (internal and external quality control, proficiency surveillance, standardization), QA activities (preventive, assessment and corrective action) QA components (pre-analytical, analytical, post-analytical)	1	2
7	Mid-term exam	Mid-term exam		
8	Pre-analytical QA	Definition, purpose Variables (biological, technical, , professional, skill, environmental factors) that might affect tests Source of errors	1	2
9	Analytical QA	Definition, purpose Standard Operating Procedures (SOPs) (definition, purpose, information of test performance) Source of errors	1	2
10	Accuracy and precision in analytical QC	Precision and accuracy (definition, purpose, calculation, source of errors and common causes of	1	2

		errors)		
11	Post-analytical QA	Definition and purpose Reporting test result Review transcription errors Issuing of test results	1	2
12	Quality control (QC)	Definition, purpose Internal QC: definition, purpose External QC: definition, purpose Materials of QC External quality assessment Review transcription errors Issuing of test results	1	2
13	Monitoring QC data	Basic biostatistics (mean, STD, CV calculation) of control materials Creating of a levey-Jennigs chart Westgrad control rules	1	2
14	Assessing value of the tests	Purposes Factors effect value of the test method Ability of tests to diagnose of disease Sensitivity, specificity, effectiveness and predictive value of test (definition, purpose and calculation)	1	2
15	Assessment and accreditation of clinical laboratory	National standards and technical guidelines Certification and accreditation Process of accreditation Benefits of accreditation	1	2
16	Final examination		1	2
				32

Total	16	

IV. Teaching Strategies :-

No.	Activity		Week	Mark
1	Reports	a1, a2, c1, d1,	7, 9	2.5%
2	Seminar	a1, a2, c1, d1	10, 13	2.5%
3				

Second : Practical Part :-

No.	Practical Experiment	No. of Weeks	Actual Hours
1	Visiting clinical laboratory and writing report about its organization and personnel	1	2
2	Procedures of clinical laboratory safety including personnel protection, disposal of laboratory materials and glassware disinfection	1	2
3	Procedures of pre-analytical QA in routine clinical laboratory tests (patients preparation, blood collection and sampling)	1	2
4	Calibration of used glassware, traditional pipetting and automated pipette in routine clinical laboratory test	1	2

5	QC calibration of used instruments in routine clinical laboratory test (e.g. spectrophotometer, balance and water bath)	1	2
6	Standard preparation of common clinical laboratory tests (e.g. hemoglobin and glucose standards)	1	2
7	Control material preparation of common clinical laboratory tests (e.g. hemoglobin and glucose controls)		
8	Calculation of mean, SD and CV of prepared control materials (e.g. Hb, glucose)	1	2
9	Usage the QC material for accuracy and precision determination in routine clinical laboratory test (e.g. Hb level, glucose)	1	2
10	QC procedures in complete blood count by correlation between its values and stained blood film	1	2
11	Determination of sensitivity, specificity and predictive value of test (e.g. HBV and glucose by different tests)	1	2
	Final exam	1	2
Total		11	22

VIII . Learning Evaluation :-

No.	Evaluation Activates	Week	Marks	Degree ratio to degree of the final evaluation	Outcome
1	Assignment	3- 13	5	5	d2
2	First Exam (Pop Quiz)	6	5	5	a1, a2, b1
3	Med Term Exam	8	20	20	a1, a2, b1, d2
4	Final Practical Exam	15	20	20	a1, a2, b1, b2, c1,c2

5	Final Exam	50	50	50	a1, a2, b1, d2

IX . Learning Resources :-

No	
1	**1- List of references:** World Health Organization, Laboratory Quality Management System, Clinical Laboratory Standards Institute, 2011 2- Endris Mekonnen, Health Laboratory Management and Quality Assurance, University of Gondar, Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education, 2004
2	**Recommended books and reference materials1-** • ISO 15189:2007. Medical laboratories—Particular requirements for quality and competence. Geneva, International Organization for Standardization, 2007. • ISO/IEC 17025:2005. General requirements for the competence of testing and calibration laboratories. Geneva, International Organization for Standardization, 2005. • CLSI/NCCLS. Application of a quality management system model for laboratory services; approved guideline—3rd ed. GP26-A3. Wayne, PA, NCCLS, 2004. • CLSI/NCCLS. A quality management system model for health care; approved guideline—2nd ed. HS1-A2. Wayne, PA, NCCLS, 2004.
3	Internet
4	
5	

Republic of Yemen

Jiblah University For Medical Sciences

الجمهورية اليمنية
جامعة جبلة للعلوم الطبية والصحية

Course Specification (Medical Virology)

I. Course Identification and General Information:

1	Course Title & Code: ##	Medical Virology ك.طب.كاد3222				
2	Credit hours	C.H.				Total
		Theoretical part	Seminar	Practical part	Training	
		2	**0**	**2**	**0**	**4**
3	Level/semester at which this course is offered:	Third Level/ First Semester				

4	Pre –requisite(s) (if any)	General Microbiology, Biochemistry
5	Program(s) in which the course is offered	B.Sc. in Medical Laboratory Sciences
6	Language of teaching the course	English

II. Course Description:

The course covers the fundamental principles generally related to the virus structure, chemical and physical properties, classification, genetics, replication, pathogenesis, transmission, cultivation, laboratory diagnosis and treatment of viruses. Then it focuses on medically important individual virus families and groups with more concentration on diseases that are related to viral infections prevalent in our local community than others, such as Hepatitis B viruses, Influenza viruses, Rota viruses ….etc. The included virus families and groups are studied for their properties, diseases they cause, replication, pathogenesis, clinical findings, laboratory diagnosis, treatment and prevention measures including immunization.

III. Course Objectives:

1. The student will understand the general principles of virology including general properties of viruses, classification, genetics, and viral cultivation.
2. Provide a review of the viral diseases etiology, mode of transmission, replication, pathogenesis, control and antiviral drugs.
3. Describe the structure and replication strategies of the most important individual viruses, including the processes of entry into cells, gene transcription, genome replication, virion assembly and egress from the cell.
4. Provide students an important knowledge about individual viruses pathogenesis, laboratory diagnosis, sterilization and immunization.
5. To familiarize students with the common viral infections that are endemic or those may appear as newly emerging viral diseases.
6. Encourage the development of skills enabling acquisition, critical analysis, interpretation and discussion of relevant factual virology information.

IV. Intended Learning Outcomes (ILOs)

(A) Intended Learning Outcomes of Knowledge and Understanding:

By the end of the course, students should be able to:

A1. Learn the essential concepts of virology, which include the structure of different viruses, properties, classifications, and replication.

A2. Define the different treatment strategies used in viral infections and principles of viral sterilization.

A3. Knowledge of the properties of most important individual viruses, mode of infection, the routes of dissemination, replication and epidemiology.

A4. Demonstrate knowledge and understanding of pathogenic, diagnostic and therapeutic/prophylaxis aspects of individual viruses.

(B) Intended Learning Outcomes of Intellectual:

By the end of the course, students should be able to:

B1. Predict the possible causative viral agents for any human body system infection.

B2. Discriminate the mode of virus infection, entry, replication and shedding for different viruses.

B3. Correlate between different diseases and viruses associated with them to reach to final diagnosis.

B4. Select the suitable sample and the suitable laboratory test for diagnosis.

B5. Choose the required measurements for prevention and control of viral diseases.

(C) Intended Learning Outcomes of Professional and Practical Skills:

By the end of the course, students should be able to:

C1. Perform various clinical laboratory procedures including specimen collection, processing, isolation and identification of viral pathogens.

C2. Carry out different methods of laboratory diagnosis that are available for each viral infection and which is the highly recommended.

C3. Perform serological tests used for detection of viral antigens or antibodies for clinical samples and interpret the results.

C4. Know or practice if available the molecular techniques and procedures used for virus detection.

C5. Demonstrate understanding of quality control as well as infection control measures in the virology laboratory.

(D) Intended Learning Outcomes of General and Transferable Skills:

By the end of the course, students should be able to:

D1. Be self-motivated learners and responsive to discussion groups and to feedback.

D2. Work a research in virology field independently or within a team.

D3. Know and predict the sources of viral infection especially for zoonotic viral diseases and the consequent animal control.

D4. Evaluate recent researches implicated on the pathobiology and laboratory diagnosis of virus infections.

D5. Integrate experimental strategies learned in the context of individual viral lectures into the design of control systems and vaccination development.

Order	Theoretical Topics	Hours	Sub- Topics List	Weeks
1	**General properties of viruses**	2	Definition and history of viruses Virus structure and composition Viral classification, reaction to physical and chemical agents Viral genetics	1
2	**Viral replication and**	2	Replication of viruses, pathogenicity of viral diseases,	1

	pathogenesis		acute, chronic and latent infection, emerging viral diseases	
3	**Lab diagnosis and control of viral diseases**	**2**	Microscopy, serology, PCR and viral load, cultivation and assay of viruses, quantitation of virus, purification and identification of viruses, prevention and antiviral drugs	**1**
4	**Respiratory viruses**	2	Orthomyxoviruses paramyxoviruses; parainfluenza and RSV coronaviruses.	**1**
5	**Hepatitis viruses**	**4**	Hepatitis viruses A, E and C Hepatitis viruses B and D	**2**
6	**Childhood viral infections**	**2**	Measles Mumps Rubella virus Rotavirus	1
7	**Mid exam**	**1**		1
8	**Herpesviridae**	**2**	Herpes simplex virus 1,2 Varicella zoster virus Cytomegalovirus Epstein-Barr virus	1
9	**Retroviruses and human cancer virus**	**2**	Human immunodeficiency virus (HIV) Oncogens and tumor suppressor genes. Papilloma viruses	1
10	**Picornaviruses**	**2**	Poliovirus Coxsackie viruses Echoviruses	1
11	**Arboviruses and unusual viruses**	**2**	Rabies virus Dengue and Zika virus Yellow fever virus Ebola virus	1
12	**Final exam.**	**2**		

Total		**23**		12	

- Practical Aspect

Order	Practical Experiments	Number of Weeks	Contact Hours	Aligned CILOs
Exp #1	Collection, preservation and transport of virus containing specimens	1	2	
Exp #2	Direct detection of viral antigens (HBS)	1	2	
Exp #3	Detection of antiviral antibodies (HCV, HIV)	1	2	
Exp #4	Electron microscopy applications for diagnosis	1	2	
Exp #5	Molecular detection of viral nucleic acid + sequencing	2	4	
Exp #6	Tissue culture and its use in virus isolation	1	2	
Exp #7	Virus quantitation	1	2	
Exp #8				
Number of Weeks/Contact Hours per Semester		**8**	**16**	

V. Schedule of Assessment Tasks for Students during the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Quizzes	3rd and 9th	5	5
2	Attendance	All weeks	5	5
3	Practical activities in the lab	All weeks	10	10
4	Mid- Exam	8th	10	10
5	Final practical exam	13th	20	20
6	Final theoretical exam	14th	50	50
Total			100	100%

VI. Learning Resources:

1- Essential References.

1. Jawetz, Melnick and Adelberg's Medical Microbiology Medical Microbiology 26th edition, 2013, a LANGE medical book
2. Carter J.B. and Saunders V.A. Virology, Principle and Applications, ISBN 978-0-470-02386-0
3. Desselberger U. Medical Virology: a practical approach. 1995. Oxford University Press. Oxford, United Kingdom.
4. Howard C.R. Burrell C.J. Murphy F.A. Fenner and White's Medical Virology, Fifth Edition. 2017. Academic Press Inc. San Diego, United States

Another curriculums

London School of Hygiene & Tropical Medicine, UK

1	Course Title: Clinical Virology Course Description: • Lectures will cover respiratory infections, Quality Assurance and Health & Safety issues, gastrointestinal infections, congenital infections, antivirals,

	childhood infections, HIV diagnosis & management, travelassociated viral infections, emerging viral infections (Ebola) and the discovery & pre-clinical development of relenza • Practical sessions will cover Enzyme-ImmunoAssay (EIA), serology and electron microscopy applications for diagnosis, PCR-based applications for diagnosis, an Infection Control exercise and applications of immunefluorescence for diagnostics
University of Yaoundé, Cameroon.	
	Course title: Medical Virology Part 1: Review of key Virology concepts and principle of viral classification Unit 1 Review of key Virology concepts Unit 2 Evolutionary origin of viruses Unit 3 Classification and structure of viruses Part II: Review of general features of viral transmission and reproduction Unit 4 General principle of viral transmission and Viral reproduction Unit 5 Pathogenesis and Control of Viral Diseases Part III: RNA Viruses Unit 5 Single-stranded RNA viruses: HIV and other lentiviruses Unit 6 Single-stranded RNA viruses: Poliovirus, Rhinovirus, Norovirus and Hepatitis A virus Unit 7 Single-stranded RNA viruses: Filoviruses, Orthomyxoviruses Paramyxoviruses and Rabies virus. Unit 8 Double-stranded RNA viruses: Rotavirus Unit 9 Term paper presentation Part IV: DNA Viruses Unit 10 Hepadnaviruses and other reverse-transcribing DNA viruses; Herpesviridae: HSV1, HSV2, Herpes simian B virus and Varicella zoster virus, Human Papilloma Virus Unit 11 Viral infective syndromes: Respiratory tract and central Nervous System viral infections

	Unit 12 Viral infective syndromes: hepatic and digestive tract viral infections Unit 13 Viral infective syndromes: Occular, skin and mucus layer viral infections
Fakeeh Collage of medical Science, Kingdom of Saudi Arabia Course title and code: Clinical Virology	
1	virus structure, virus replication, virus pathogenesis, and cultivation of viruses, laboratory diagnosis of viruses, treatment and control of viruses. Viral laboratory diagnosis of pathogenic viruses includes preparation of the sample for viral testing, choice of the appropriate technique for diagnosis of viral infection. Laboratory techniques include antigen and antibodies detection, virus isolation and molecular techniques

Instructor Name: **Dr. Ghamdan Altahish** **Head of Dept. Name:** **Dr. Jamil Obaid**

Assistant Prof. of Microbiology

Faculty of medicine and health sciences

Hodeida University